This Page is Inserted by IFW Indexing and Scanning Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

☐ BLACK BORDERS

☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES

☐ FADED TEXT OR DRAWING

☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING

☐ SKEWED/SLANTED IMAGES

☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS

☐ GRAY SCALE DOCUMENTS

☐ LINES OR MARKS ON ORIGINAL DOCUMENT

☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY

☐ OTHER: ______________________

IMAGES ARE BEST AVAILABLE COPY.
As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-296231

(43)Date of publication of application : 21.10.1994

---

(51)Int.Cl.

H04N 1/40
G06F 15/62
G06F 15/66
G06F 15/66
G06F 15/68
G09G 5/06
H04N 1/46

---

(21)Application number : 05-082899

(22)Date of filing : 09.04.1993

(71)Applicant : TOYO INK MFG CO LTD

(72)Inventor : ISHIDA AKIRA

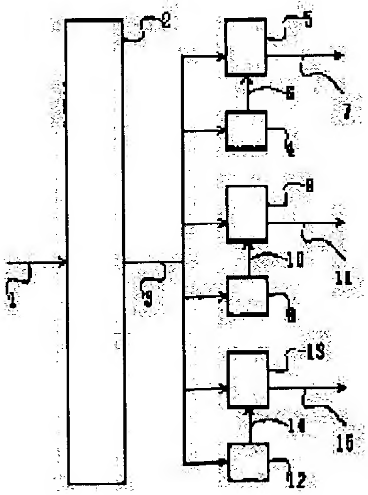
---

(54) COLOR VALUE TRANSFORMATION

(57)Abstract:

PURPOSE: To improve the transformation precision by providing an affine transformation means for color value in the preceding stage of a transformation means using a lock up table which transforms a color value to a color expression value peculiar to an output device.

CONSTITUTION: An inputted L*a*b* value 1 is transformed to an FGH value 3 by an affine transformation means 2 and is inputted to transformation means 5, 9, and 13 using the look up table method with interpolation. The means 5 retrieves a look up table LUT 4 to transform the FGH value to a C value and calculates an interpolation value C and outputs a C value 7. In the same manner, means 9 and 13 retrieve LUTs 8 and 12 to transform the FGH value to an M value and a Y value respectively and calculate interpolation values M and Y and output an M value 11 and a Y value 15. In this constitution, transformation is performd with a high precision by adding relatively simple matrix calculation.



LEGAL STATUS

[Date of request for examination] 06.03.2000

[Date of sending the examiner's decision of 04.02.2003 rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The color value inverter characterized by having the affine transformation means of a color value in the preceding paragraph of said conversion means in an inverter including a conversion means to change a color value into an output unit at the color expression value of a proper using the look-up table method with interpolation.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any
damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the equipment which is used in case a color is outputted or displayed with a color printing machine, a color printer, a color copying machine, color facsimile, a color display, etc. and which changes a color value into an output unit at the color expression value of a proper.
[0002]
[Description of the Prior Art] In the image edit equipment conventionally used in the field of printing, the cyanogen (C) of printing ink, a Magenta (M), yellow (Y), and the value proportional to halftone dot % of Japanese ink (K) are used abundantly as an amount showing color, and these values are acquired from the color scanner for printing.
[0003] Although it connects with the image edit equipment used in the field of printing and various kinds of [recently] color printers, color copying machines, etc. have come to be used as an alternative of a proofreading machine, electrophotography, sublimation mold hot printing, the ink jet of those image reappearance devices, etc. are various, and the pigment of various kinds [color material] and the color are used. Moreover, even if it makes it a color display, color-enhancing ability changes with models.
[0004] Although these output units inputted the CMY value, the CMYK value, the RGB value, etc. as data, it was difficult to acquire the same color on a printing lifter or a screen by the difference in an image reappearance device or color material only by transmitting the aforementioned CMY value or aforementioned CMYK value of image edit equipment to an output unit like a color printer or a color display as it is.
[0005] Then, it is CIEL* a* b* to the data representation which image edit equipment uses instead of a CMYK value. Using the value independent of the property of an output unit like a system, in case it outputs to various kinds of output units, changing into the CMY value which is a color expression value peculiar to an output unit, a CMYK value, a RGB value, etc. is being performed.
[0006] CIEL* a* b* The approach using the look-up table method with interpolation as the technique of changing a value into the CMY value which is a color expression value peculiar to various kinds of output units, a CMYK value, a RGB value, etc., the approach using a neural network, etc. are learned well.
[0007]
[Problem(s) to be Solved by the Invention]
[0008] Generally, the data space of a color expression value peculiar to an output unit is CIEL* a* b*, while the circumscription cube on orthogonal spaces is filled, as shown in drawing 1 . The data space of the color value independent of an output unit like a value is not full in a circumscription cube parallel to the shaft on orthogonal spaces, as shown in drawing 2 .
[0009] Therefore, when the look-up table method with interpolation was used, the useless data space which is not searched in a look-up table was generated, therefore the problem that conversion precision did not improve was considering the number of partitions of a look-up table.
[0010]
[Means for Solving the Problem] Corresponding to this purpose, this invention is characterized by having the affine transformation means of a color value in the preceding paragraph of the conversion means using a look-up table in the inverter including a conversion means to change a color value into an output unit at the color expression value of a proper using the look-up table method with interpolation.
[0011]

[Function] The expression approach of color is CIEL* a* b* as the color expression approach for which it does not depend on an output unit although it is various. Space and CIEL* u* v* A color value, a call, and all are the space of a three dimension here about the value of the color defined by the data space for which there are space, XYZ space, Munsell space, etc. and it does not depend on such an I/O device.

[0012] It is data space various ****s, such as a value relevant to quantity of electricity for a printing machine, a color printer, the value relevant to % value of a halftone dot and the coating weight of a color or a pigment like a color copying machine, etc. being in an output unit also at the color expression approach of a proper, and making the Braun tube emit light like a color display, a three dimension, or 4-dimensional.

[0013] This invention uses and changes the look-up table method with interpolation into the output unit corresponding to it for the aforementioned color value at the color expression value of a proper.

[0014] As a color value, it is CIEL* a* b* as the following and an example. It will explain to an output unit supposing the CMY value which is halftone dot % to the cyanogen ink which is printing ink as a color reproduction value of a proper, Magenta ink, and yellow ink supposing space.

[0015] The color reappearance range of an output unit like a color printer or a color display is CIEL* a* b*. On space, it is shown like drawing 2 . In drawing 2 , w, r, g, b, c, m, y, and k of each top-most vertices show White, red, Green, blue, cyanogen, a Magenta, yellow, and the point corresponding to each color of black, respectively.

[0016] Sign 102 The circumscription cube surrounding said color reappearance range parallel to L* shaft, a* shaft, and b* shaft is shown.

[0017] It is CIEL* a* b* conventionally. In case data are changed into CMY space from space, it is CIEL* a* b* like drawing 2 . It is said circumscription cube 102 on space. Three look-up tables of the three dimension divided at equal intervals are prepared for each shaft. It is L* a* b*, respectively. The conversion to C value from a value, and L* a* b* The conversion to M value from a value, and L* a* b* It used for the conversion to Y value from a value.

[0018] Now, the FGH orthogonal spaces of a three dimension are assumed.

[0019] Although you may choose any top-most vertices, the conversion which top-most vertices w are mapped [conversion] at the zero of FGH orthogonal spaces, for example, and makes F shaft of FGH orthogonal spaces, G shaft, and H shaft map the line which connects w-y, w-m, and w-c is considered.

[0020] This conversion can be carried out using the matrix of the three-line four trains shown in drawing 3 , the possible thing is mathematically known according to the matrix of the three-line three trains which show it to drawing 4 if the line which only connects w-c, w-m, and w-y is made to only map so that it may become parallel to F shaft, G shaft, and H shaft, and such conversion is called affine transformation.

[0021] The output reappearance range becomes like drawing 5 on FGH orthogonal spaces as a result of this affine transformation.

[0022] Sign 103 It is the color reappearance range after affine transformation, and is a sign 104. Color reappearance range 103 after affine transformation It is a circumscription cube parallel to F shaft to surround, G shaft, and H shaft.

[0023] Three look-up tables of a three dimension are prepared on FGH space, and it uses for the conversion to C value from a FGH value, the conversion to M value from a FGH value, and the conversion to Y value from a FGH value, respectively.

[0024] That is, L* a* b* A value is once changed into a FGH value and it is changed into C value, M value, and Y value using three look-up tables prepared on FGH space.

[0025] Compared with drawing 2 , the rate [/ in a circumscription cube] of fullness of drawing 5 is improving, compared with the conventional approach, the futility of a look-up table decreases and conversion precision of the approach of this invention improves.

[0026] In any case, it is effective although various kinds of approaches, such as "primary interpolation using eight points", "primary interpolation using four points", "primary interpolation using six points", and "secondary interpolation using 27 points", are learned by the approach of calculating a interpolation value using a look-up table.

[0027] "primary interpolation using eight points", and "primary interpolation using four points" -- being related -- the Society of Electrophotography of Japan -- the 29th volume -- the 3rd -- No. (1990) 299 Page -305 It is indicated by the page.

[0028]

[Example] Drawing explains an example below.
[0029] Based on this invention, structure as shown in drawing 6 was realized.
[0030] The interpolation approach adopted "primary conversion using eight points."
[0031] It is L* a* b* into which a sign 1 is inputted in drawing 6 . It is a value and a sign 2 is L* a*b*. It is an affine transformation means to change a value into a FGH value, and a sign 3 is the changed FGH value.
[0032] L* a* b* A value is changed into a FGH value by the product with the matrix of three-line three trains. A FGH value a FGH value The look-up table for changing into C value The means 11 and FGH value which calculate the interpolation value M calculated from the FGH value searched with the means 8 and 8 for searching the look-up table for changing into M value the means 5 and FGH value which calculate the interpolation value C calculated from the DFG value searched with the means 4 and 4 for searching It is inputted into a means 13 to calculate the interpolation value Y calculated from the FGH value searched with the means 12 and 12 for searching the look-up table for changing into Y value.
[0033] The look-up table in a sign 4 consists of three dimensions, the C value of eight perimeters surrounding the point searched for with the FGH value inputted is inputted into a means 5 through a sign 6, and the C value shown with a sign 7 by the proportion of a three dimension is calculated with a means 5.
[0034] M value shown with a sign 11 and Y value shown with a sign 15 are also calculated by performing the same count as the case where C value is calculated.
[0035] The structure based on the conventional approach as shown in drawing 7 for a comparison was realized.
[0036] It is L* a* b* into which a sign 1 is inputted in drawing 7 . It is a value. L* a* b* A value The look-up table for changing into C value L* searched with the means 16 and 16 for searching a* b* The interpolation value C calculated from a value The means 17 and L* a* b* to calculate A value The look-up table for changing into M value L* searched with the means 20 and 20 for searching a* b* The means 21 and L* a* b* which calculate the interpolation value M calculated from a value L* a* b* searched with the means 24 and 24 for searching the look-up table for changing a value into Y value It is inputted into a means 25 to calculate the interpolation value Y calculated from a value.
[0037] The look-up table in a sign 16 is L*a* b* which consists of three dimensions and is inputted. The C value of eight perimeters surrounding the point searched for with a value is inputted into a means 17 through a sign 18, and the C value shown with a sign 19 by the proportion of a three dimension is calculated with a means 17.
[0038] M value shown with a sign 23 and Y value shown with a sign 27 are also calculated by performing the same count as the case where C value is calculated.
[0039] the offset press -- halftone dot % of each ink of cyanogen, a Magenta, and yellow -- 0-100 up to -- it changes by a unit of 10% -- making -- the color chip of 1331 colors -- printing -- a colorimetry -- carrying out -- L*a* b* The value was acquired and the look-up table in signs 4, 8, 12, 16, and 20 and 24 was created.
[0040] For a look-up table, it calculates by carrying out also to each shaft comparatively for 5 minutes, a conventional method is compared with the count result of this invention, and the direction of the approach of this invention is 1.3. Precision with about [sufficient] twice was acquired.
[0041]
[Effect] Thus, according to this invention, compared with the former, the conversion means to the color expression value of a proper is acquired from a color value by the output unit in a better precision by addition of comparatively easy matrix count. Moreover, this invention can be used effective also in computer color matching.

[Translation done.]

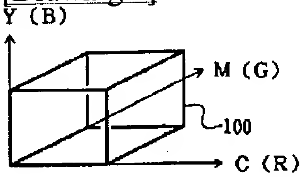
* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

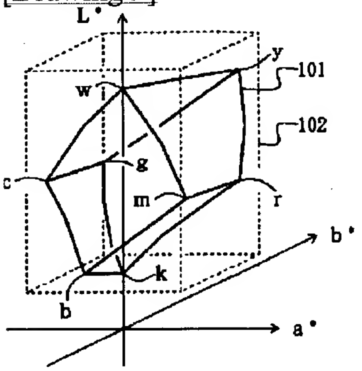
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



[Drawing 2]



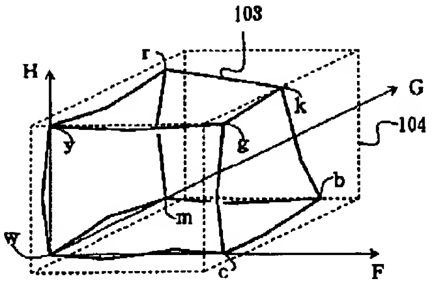
[Drawing 3]

$$\begin{bmatrix} c_1 & c_2 & c_3 & c_4 \\ m_1 & m_2 & m_3 & m_4 \\ y_1 & y_2 & y_3 & y_4 \end{bmatrix}$$

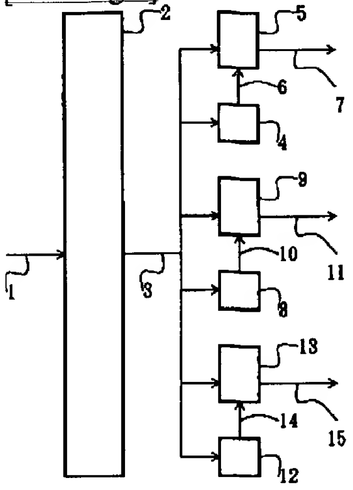
[Drawing 4]

$$\begin{bmatrix} c_1 & c_2 & c_3 \\ m_1 & m_2 & m_3 \\ y_1 & y_2 & y_3 \end{bmatrix}$$

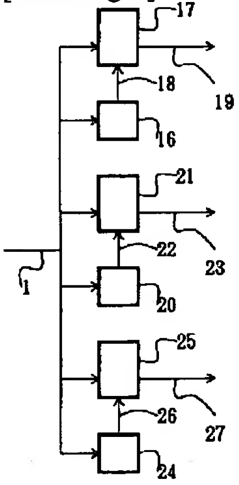
[Drawing 5]


103
r
H
G
k
104
y
g
b
m
W
c
F

[Drawing 6]


2
5
7
6
4
9
11
1
3
10
8
13
15
14
12

[Drawing 7]


17
19
18
16
21
23
1
22
20
25
27
26
24

[Translation done.]

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-336287

(43)Date of publication of application : 17.12.1993

---

(51)Int.Cl.

H04N 1/00
G09G 5/04
H04N 1/40
H04N 1/46

---

(21)Application number : 04-164399

(22)Date of filing : 30.05.1992

(71)Applicant : MINOLTA CAMERA CO LTD

(72)Inventor : KUSUMOTO KEIJI
MUROKI KENICHI
IMAIZUMI SHOJI

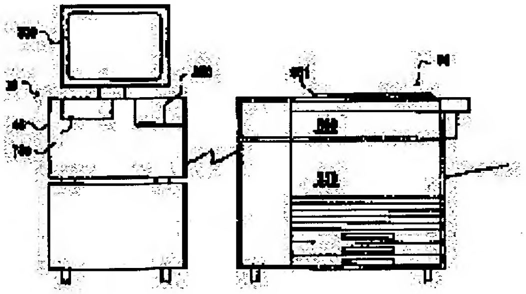
---

(54) IMAGE FORMING DEVICE

(57)Abstract:

PURPOSE: To reproduce an image having the same quality as the adjusted image on a sheet of paper by displaying the image read by a digital color copying machine on a monitor and performing the color adjustment or the like on it.

CONSTITUTION: A preview mode is set at the side of a film scanner(FS) 30, and the image reading operation is executed at the side of a copying machine 90. The read RGB picture data are accepted by the FS 30 to be displayed on a monitor 300. The image adjustment such as color adjustment is performed on the monitor 300, and the adjusted data are sent to the copying machine 90. In the copying machine 90, the image reading operation is performed three times. By adding the adjusted data, CMY data for printing are generated. The data are transferred to the FS 30 to be displayed on the monitor. Thus, the display based on the data for printing is performed, and the confirmation before printing is made available.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] A manuscript reading means to read a manuscript image and to generate the color-separation data of three colors, A image-data-processing means to change said color-separation data into the data for a print, A print means to form an image on a form based on said data for a print, A display means to display an image based on the data for a display, and the preview mode input means for ordering it a setup in the preview mode which displays the gestalt of a print image on said display means before print actuation, Image formation equipment equipped with the display-control means which will change said data for a print into said data for a display, will be made to input into said display means, and will be displayed if said preview mode is set up.
[Claim 2] It is image formation equipment said whose data for a print are Y data, M data, and C data in claim 1 and said whose data for a display are R data, G data, and B data.
[Claim 3] In claim 1, if said preview mode is set up, said manuscript reading means Three reading actuation is performed one by one to the same manuscript, and the color-separation data of three colors are generated respectively. Said image-data-processing means It is image formation equipment which performs conversion to said data for a display based on said Y data with which said display-control means was memorized, M data, and C data by memorizing by performing conversion to Y data, M data, and C data one by one respectively corresponding to said each reading actuation.
[Claim 4] A manuscript reading means to read a manuscript image and to generate the color-separation data of three colors, A image-data-processing means to change said color-separation data into the data for a print, A print means to form an image on a form based on said data for a print, The 1st preview mode which displays the gestalt of a reading image on said display means as a display means to display an image based on the data for a display, before print actuation, Or the preview mode input means for ordering it a setup of 2nd preview mode ** which displays the gestalt of a print image on said display means before print actuation, When said 1st preview mode is set up, change said color-separation data into said data for a display, make it input into said display means, and it is made to display. Image formation equipment equipped with the display-control means which changes said data for a print into said data for a display, is made to input into said display means, and is displayed when said 2nd preview mode is set up.
[Claim 5] It has an adjustment input means for adjusting the image currently displayed on said display means in claim 4. Said image-data-processing means When said 1st or 2nd preview mode is set up Image formation equipment which will change said color-separation data into said data for a print with reference to said memorized data if the data for adjustment of the image adjusted by said adjustment input means are taken in and memorized and it is ordered in print actuation.

[Translation done.]

* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to image formation equipments, such as a digital color copying machine. It is related with the equipment which displays on a display the image which should be printed and can check it before print-out in detail.
[0002]
[Description of the Prior Art] (1) The electrophotography printing machine equipped with preview equipment is indicated by JP,63-174076,A. This is equipment which carries out the exposure scan of the manuscript and reproduces an image on a form with an electrophotography method while displaying an image on a monitor based on the video signal generated by reading of a manuscript image.
(2) Color film assay equipment is indicated by JP,4-15931,B. This is equipment which memorizes the image data obtained by the scan of a color film, calculates a color and the amount of optimal amendments of concentration based on this image data, corrects a look-up table, processes said image data by this look-up table, and is displayed on a monitor. Moreover, this equipment is equipped also with the output function of the optimal data for a print at the time of a film print.
[0003]
[Problem(s) to be Solved by the Invention] In using a digital color copying machine, before print-out, image quality, such as a color of a print image, is checked and the request of wanting to prevent a mistake copy is. For that purpose, it is good to display an image on a monitor and to check it like the method currently held in said official report. However, when using a digital color copying machine for the application than to which greater importance is attached to repeatability with a delicate color, the method of the above-mentioned official report is inadequate.
[0004] That is, although the display to a monitor is performed by the method of the above-mentioned official report based on the color-separation data obtained by reading of a manuscript, this color-separation data is not in relation with the linear data for print-out (data of a recording system; Y-M-C data) for factors, such as the property of a photo conductor, the property of a toner, or an operating environment. Therefore, the image quality of the image displayed on a monitor is not equivalent to the image quality of the image printed out strictly, either.

[0005] This invention aims at enabling it to display the image of image quality equivalent to the image which should be printed out on a monitor in view of the above-mentioned situation. Moreover, this invention makes it the 2nd purpose to enable it to simplify actuation and actuation of equipment, when the strictness like the above is not required.
[0006]
[Means for Solving the Problem] A manuscript reading means for this invention to read a manuscript image and to generate the color-separation data of three colors, A image-data-processing means to change said color-separation data into the data for a print, A print means to form an image on a form based on said data for a print, A display means to display an image based on the data for a display, and the preview mode input means for ordering it a setup in the preview mode which displays the gestalt of a print image on said display means before print actuation, When said preview mode is set up, it is image formation equipment equipped with the display-control means which changes said data for a print into said data for a display, is made to input into said display means, and is displayed.

[0007] Moreover, a manuscript reading means for this invention corresponding to said 2nd purpose to read a manuscript image, and to generate the color-separation data of three colors, A image-data-processing means to change said color-separation data into the data for a print, A print means to form an image on a form based on said data for a print, A display means to display an image based on the data for a display, The preview mode input means for ordering it a setup in the 2nd preview mode which displays the gestalt of a print image on said display means before the 1st preview mode which displays the gestalt of a reading image on said display means before print actuation, or print actuation, When said 1st preview mode is set up, said color-separation data are changed into said data for a display. When make it input into said display means, it is made to display and said 2nd preview mode is set up, it is image formation equipment equipped with the display-control means which changes said data for a print into said data for a display, is made to input into said display means, and is displayed.

[0008]

[Function] The data for a print which change the color-separation data of three colors generated by reading of a manuscript image, and are obtained are inputted into a display means as data for a display under a setup in preview mode. Therefore, an image equivalent to the image which should be printed out will be displayed with a display means.

[0009] In invention corresponding to said 2nd purpose, the 1st mode and 2nd mode are prepared as preview mode. In the 1st mode, the display based on the color-separation data of three colors generated by reading of a manuscript image is performed. On the other hand, in the 2nd mode, the display based on the data for a print is performed. In addition, three reading actuation is usually needed for generation of the data for a print.

[0010]

[Example] the example of the following and this invention -- control (refer to flow chart) of the outline [5] system of the outline [2] film-scanner equipment [3] digital color copying machine [4] image processing of [1] system

It explains to ****.

[0011] [1] The schematic diagram 1 of a system shows the system of the example which consists of film scanner equipment 30 and the digital color copying machine 90.

[0012] Film scanner equipment 30 is the truck 750 of the body 40 of equipment. Film set (a negative film or positive film) An image is scanned and it is CRT display 300. While displaying, it is equipment which the read image data is transmitted [equipment] to the digital color copying machine 90 side, and may make a color picture form on a form.

[0013] the digital color copying machine 90 -- manuscript base 901 Image read station 900 which reads the manuscript image set upwards and generates image data This image read station 900 Or the printer section 950 which generates CMY data based on the RGB image data transmitted from the above-mentioned film scanner equipment 30, and forms an image on a form from -- it changes.

[0014] With this system, it is the control panel 350 of film scanner equipment 30. The upper key switch group etc. and CRT display 300 (refer to drawing 19) By the actuation input from a screen switch group (refer to drawing 8), it can be ordered the following processings or activation of operation.

[0015] (1) Manuscript reading actuation by the side of the digital color copying machine 90.

(2) Above (1) The image data generated by manuscript reading is made to transmit to the film scanner equipment 30 side, and it is CRT display 300. Processing on which an image is displayed. As image data transmitted, it is [the case of RGB data, and] 3 as follows. There is a case of the CMY data generated in manuscript reading actuation of a time.

[0016] (3) Above (2) It is based on RGB data and is CRT display 300. Processing which performs image adjustment of color adjustment etc. to the image currently displayed, and the result is made to transmit to the digital color copying machine 90 side. For example, it is ready-for-sending ability about the result of color conversion, achromatism, a profile extract and a burster trimmer stacker feature, a color tone change-over, sharpness, an image quality monitor, etc. In the digital color copying machine 90 side, the data for gamma amendment etc. are amended corresponding to the data transmitted. Next, 3 Manuscript reading actuation of a time is performed, CMY data are generated, and it is processed using the data after the above-mentioned amendment, and is transmitted to the film scanner equipment 30 side. With film scanner equipment 30, it is based on this data, and is CRT display 300. An image is displayed again.

[0017] (4) Above (2) It is based on RGB data and is CRT display 300. Specify the mode of print-out by the digital color copying machine 90 side as the image currently displayed by performing edit processing of trimming etc. For example, otherwise, it is masking, Variable power, Migration, Assignment of a mirror image etc. is possible.

[0018] (5) Above (3) Perform copy actuation with the digital color copying machine 90 using the amended data. Namely, 3 Manuscript reading actuation of a time, generation of the CMY data from the data obtained as a result, and the above (3) Print-out ** based on the amendment processing and CMY data using the data after amendment is performed.

[0019] [2] Film scanner equipment drawing 19 is the control panel 350 prepared in the top face of the body 40 of film scanner equipment 30. It is the explanatory view showing a key switch, and is drawing 8. CRT display 300 It is the explanatory view showing the example of a screen display. Moreover, drawing 4 It is the block diagram showing the configuration of the control circuit of film scanner equipment 30.

[0020] [2-1] CRT display 300 of a screen display and actuation input means book film scanner equipment **** -- drawing 8 Image field 301 for displaying the image read like with the image or the digital color copying machine 90 read with film scanner equipment 30 others -- The pull down menu field 303,304 for displaying the message region 302 for displaying various kinds of messages, and a pull down menu, The scale-factor viewing area 315 and the film size viewing area 317 for displaying the number-of-sheets viewing area 314 for displaying the set-up copy (print) number of sheets, and the set-up copy (print) scale factor It is prepared.

[0021] moreover, CRT display 300 **** -- the image adjustment switch 305, the trimming switch 306, the expansion continuous-shooting switch 307, the contraction continuous-shooting switch 308, the output check switch 309, the output size switch 310, a reset switch 311, the clear switch 312, the copy number-of-sheets increase and decrease 313 of a switch, and copying machine side preview switch 316 etc. -- the field for various kinds of switches (screen switch) is prepared. These screen switches are the trackballs 351 of drawing 19. Tab control specification is carried out by the cursor moved by actuation, and it is a tab key (trackball input key) 352. Whenever it is turned on/turned off and is turned on/turned off by actuation, the display of the switch region concerned is reversed.

[0022] the aforementioned message region 302 **** -- various kinds of messages, such as directions of the input to an operator, a purport by which the tape carrier package is drawn out or a class of film, and an output paper size, are displayed. The functions of the aforementioned screen switch are an outline and the following things. For example, expansion continuous-shooting switch 307 A sub menu is displayed by ON and a setup of output size is attained. Contraction continuous-shooting switch 308 A contraction continuous shooting mode is set up by ON. Output size switch 310 A sub menu is displayed by ON and a setup of a paper size is attained. Reset switch 311 Copy mode is initialized by ON. Copy number-of-sheets increase and decrease 313 of switch Copy number of sheets is risen or downed by ON. In addition, the copying machine side preview switch 316, the image adjustment switch 305, the trimming switch 306, and the output check switch 309 If it attaches, it mentions later. Moreover, as a screen switch, the screen switch like drawing 10 and drawing 11 is also formed in the below-mentioned pull down menu in addition to the above-mentioned switch.

[0023] CRT display 300 Control panel 350 prepared in the top face by the side of a body 40 at this film scanner equipment 30 besides the upper above-mentioned screen switch It has the upper key switch group or the key switch group on the inner panel which is not illustrated [which was prepared in the interior of a body 40], and various commands are inputted also by these actuation.

[0024] For example, control panel 350 Upwards, like drawing 19, a trackball 351, It is CRT300 about reading actuation of the manuscript image by the side of a tab key (trackball input key) 352, film scanner equipment 30, or the digital color copying machine 90, and the read image. The image input key 353 for ordering it what is displayed above, the pudding for ordering it the stop key 354 for ordering it a halt of operation, and the print-out by the side of the digital color copying machine 90 -- ibis -(copy key) 355 It is arranged.

[0025] Trackball 351 It is the solid sphere which rotates free by manual operation, and is this trackball 351. By rotation, it is CRT display 300. The upper cursor is moved. A tab key (trackball input key) 352 is a key for inputting the coordinate specified with cursor. For example, if a tab key (trackball input key) 352 is operated in the condition that cursor is directing any of said screen switch they are, the mode or actuation which the screen switch concerned shows will be chosen.

[0026] [2-2] Control circuit book film scanner equipment 30 is drawing 4. It is controlled by shown CPU1.

[0027] CPU1 is a data bus 651. And address bus 652 It minds and they are a program ROM 601, the tables [EEPROM / ROM, RAM /603 /, and / 604] 602, a timer 605, the communication link port 606, parallel I/O607, and the R-G-B input image memory 608. It connects. This input image memory 608 It is prepared for each of R, G, and B.

[0028] program ROM 601 **** -- the program of CPU1 is stored. RAM603 It is used for storage of various kinds of required variables in case the above-mentioned program is performed. EEPROM604 It is used for storage of the parameter for adjusting the variation in equipment each. Timer 605 It is used for creating a predetermined timer value from a clock signal by setup from CPU1. Communication link port 606 It is used for transmission and reception of the information on an external device. Parallel I/O607 It is used for the output of the control signal for controlling a peripheral device, and the input of the condition signal of a peripheral device. Input image memory 608 It is used for the read image data storage.

[0029] On the other hand, it is CRT display 300. The display controller (AGDC) 610 which controls a display is the AGDC address bus 662. And AGDC data bus 661 It minds and they are a kanji ROM 611, RAM612 of a working-level month, and VRAM613. It connects. This VRAM613 Three image planes for the image data of each color, and CRT displays 300 It has a total of five planes of two character pre-N C1 for migration display elements, such as fixed elements, such as said upper screen switch, and cursor, or a trimming frame, and C2.

[0030] In addition, the above VRAM 613 The image data memorized by said input image memory 608 at each image plane is AGDC610. Although it is transmitted by control and memorizes, according to the command from CPU1, logging, zooming, etc. of a part of image data are performed in that case.

[0031] [3] Digital color copying machine drawing 2 The internal configuration of the digital color copying machine 90 is shown, and it is drawing 3. The image-processing process in this copying machine 90 is shown.

[0032] [3-1] the device digital color copying machine 90 -- manuscript base 901 Manuscript read station 900 for reading the upper manuscript image This manuscript read station 900 Or the printer section 950 which forms an image on a form based on the image data from said film scanner equipment 30 side from -- it changes.

[0033] Manuscript read station 900 Reading actuation is started then corresponding to the input from the copy key of a non-illustrated copying machine control panel, or the scanning demand (drawing 17 and S541 reference) from the film scanner equipment 30 side. That is, it is the scan section 910 by the driving force of the scan motor M1. Manuscript base 901 It is moved along an inferior surface of tongue, a manuscript image is read per Rhine by this, and they are image sensors 911. Photo electric conversion is carried out.

[0034] The electrical signal acquired by the above-mentioned photo electric conversion is the image-processing circuit section 400. Print head control section 951 after being inputted and processed It is inputted and, thereby, is the printer section 950. Print actuation is attained. In addition, the image-processing circuit section 400 About signal processing, it is drawing 3. It bases and mentions later.

[0035] next, the printer section 950 ******** -- it explains. The above-mentioned print head control section 951 Laser equipment 953 to drive Photo conductor drum 960 The electrostatic latent image corresponding to image data is formed in a front face.

[0036] This electrostatic latent image is the development unit 970. Negatives are developed and it considers as a visible toner image. development unit 970 Cyanogen C, Magenta M, and a yellow Y -- and It has four development counters with which which toner of Black Bk was contained, and the development counter chosen according to a development process is positioned in a predetermined development location.

[0037] It is the photo conductor drum 960 by which the above-mentioned developing machine. The toner image developed on the front face is the imprint drum 980 next. The form twisted upwards imprints. here -- a form -- form stowage 986 Or Trey Nakama 985 from -- paper is pulled out and fed and it positions to predetermined timing -- having -- imprint drum 980 It is twisted.

[0038] in this way -- if the imprint of the count of the need according to color mode is completed -- a form -- imprint drum 980 from -- it removes -- having -- anchorage device 990 it is conveyed and fixing processing by thermocompression bonding is performed -- having -- paper output tray 995 outside the plane after that It is discharged upwards. In addition, when the image formation to the same form is the again required mode, it is a paper output tray 995. Not a side but Trey Nakama 985 It is sent into a side and image formation processing is performed again.

[0039] [3-2] the image-processing process image-processing circuit section 400 **** -- drawing 3 like -- processing is performed. First, the electrical signal acquired by the aforementioned photo electric conversion is an exposure lamp, the nonuniformity of the quantity of light of optical system, and image sensors 911 at the shading compensation section after being changed into the digital data of RGB in the A/D-conversion section next. The variation in the sensibility of each pixel is amended.

[0040] The RGB output from the shading compensation section is the selector section 415 respectively. Driver 450 It is sent. Selector section 415 Printer section 950 About the RGB image data sent to a side, it is the manuscript read station 900 of a copying machine. It is the block which switches whether it takes in from a side, or it takes in from the film scanner equipment (external device) 30 side. This change-over is performed by the control signal 1 controlled by CPU2 (drawing 17, and S521 and S523 reference). Driver 450 Manuscript read station 900 of a copying machine It is the block which switches whether the RGB image data generated are transmitted to the film scanner equipment (external device) 30 side. This change-over is performed by the control signal 3 controlled by CPU2 (drawing 17, and S531 and S533 reference).

[0041] Selector section 415 The RGB image data inputted are sent to a reflectance density transducer, and reflection factor-concentration transform processing is performed to it. This is for making processing with a latter block easy to perform. Moreover, tone reproduction processing of highlights section emphasis, shadow section emphasis, etc. is also performed by this block.

[0042] Synthetic processing is carried out in the color correction section, and the RGB image data outputted from a reflectance density transducer are changed into which data (data of a print system) of Y, M, C, and (Bk). Selection of whether to change into which data is the printer section 950. It is related as the actuation in a side and managed by CPU2.

[0043] The output from the color correction section passes through an edit control section, the MTF amendment section, and variable power and the migration section, and is gamma amendment section 445. It is sent. An edit control section is a block which performs edit processing, for example, elimination outside the appointed field is performed at the time of trimming edit. Processing of edge enhancement, smoothing, etc. is performed in the MTF amendment section. In variable power and the migration section, processing of conversion of the pixel consistency of a main scanning direction, the shift of an image, the repeat output of the same field, etc. is performed.

[0044] gamma amendment section 445 The relation between the manuscript concentration then read and the image concentration reproduced is amended. Namely, property of a photo conductor, Property of a toner, The manuscript concentration read and the image concentration reproduced are not linear because of other environmental factors etc. For this reason, gamma amendment section 445 Amendment processing is performed. Moreover, in this system, image quality, a color tone, etc. are adjusted by switching various gamma curve setup ROM built in by the command from CPU2 (drawing 18, and S561 and S563 reference). It is the method (a) which changes the inclination of I/O as mode of processing here as shown in drawing 20. Method which changes bias level (b) And the method which combined these is held.

[0045] gamma amendment section 445 An output is said print head control section 951. Driver 460 It is sent. Print head control section 951 As mentioned above, it is laser equipment 953. It is the block which carries out drive control, and, thereby, print actuation is enabled. Driver 460 The above-mentioned image-processing circuit section 400 It is the block which switches whether the image data of Y, M, and C which were generated by processing, i.e., the image data of a print system, is transmitted to the film scanner equipment (external device) 30 side. This change-over is performed by the control signal 2 controlled by CPU2 (drawing 18, and S551 and S553 reference).

[0046] [4] the outline of an image processing, next drawing 5 - drawing 7 It is based and the outline of image data processing by the side of film scanner equipment 30 is explained.

[4-1] Single dimension color CCD 201 of scanner side input film scanner equipment 30 Said truck 750 It decomposes into R, G, and B and the transmitted light from the film set to the inner predetermined location is read per Rhine. Hereafter, although it is based mainly on R signal and explained, the same is said of G signal and B signal.

[0047] CCD series 201 from -- R signal outputted -- video amplifier 202 It is amplified. The amplification factor is a data bus to D/A converter 203 here so that a MAX value may turn into a predetermined value. It is minded and set up. Thereby, amendment of a difference of the RGB sensibility by difference of the class of film and amendment of a difference of exposure conditions are attained on MAX level.

[0048] video amplifier 202 from -- R signal outputted -- next, A/D converter 204 A/D conversion is carried out.

At this time, it is the memory 205 for shading compensations. A shading compensation is also performed with reference to criteria data. namely, the criteria data memorized by the prior scan -- memory 205 for shading compensations from -- it reads -- having -- D/A converter 206 Above-mentioned A/D converter 204 as reference voltage after D/A conversion was carried out It is inputted.

[0049] R data after A/D conversion and a shading compensation are the alignment section 230 between RGB next. It is inputted. This block 230 Said CCD series 201 It is the block which amends a gap of timing with G data and B data which originated in spacing of R, G, and B each Rhine, and have been generated. the alignment section 230 between RGB from -- the RGB data outputted -- CRT display 300 It branches on the root for the display to a side (block 232 -255 side), and the root (block 260 -265 side) by the side of the digital color copying machine 90.

[0050] [4-2] Root selector 232 by the side of a CRT display It is CRT display 300 about the image read with film scanner equipment 30. It is CRT display 300 about the image read by the displaying [it] and digital color copying machine 90 side. It is the block which switches whether it displays according to the command from CPU1. When copying machine side preview mode is set up in this system, incorporation of the image data from the digital color copying machine 90 side is performed (drawing 12, and S11 and S15 reference), and it is CRT display 300. It is displayed.

[0051] selector 232 from -- the incorporated image data -- CRT display 300 Memory 240-242 for displaying It is stored. This memory is prepared for every RGB data, and read-out of it is made possible from CPU1. Moreover, the memory for non-illustrated characters is also prepared separately. In addition, when the data from a copying machine 90 side are incorporated, there are a case of RGB data and a case of CMY data.

[0052] The output from each memory is LUT250 which corresponds respectively. It is inputted. When processing the image data from the film scanner equipment 30 side, it is this LUT250. Normalization amendment processing, A negative positive reversal process and RGB independent color tone ready processing are performed. Normalization amendment processing is the MIN value of RGB each signal, and is processing to which it is made for the output width of face to an input to turn into predetermined width of face. A negative positive reversal process is processing which changes the reading data of a negative film into POJIDE-TA, and is changed into linear data to the reflection factor of a manuscript. RGB independent color tone ready processing is CRT display 300. It is the processing which operates input / output relation by independence of RGB Rhine by color tone ready actuation. On the other hand, when processing the image data from the digital color copying machine 90 side, it is this LUT250. It is set up so that I/O may become a linear. In addition, it is the case where the image data from the digital color copying machine 90 side is processed, and when the data is CMY data, a negative positive reversal process is performed.

[0053] the above LUT 250 from -- the processing to the data outputted is with the case where the image data from the film scanner equipment 30 side is processed, and the case where the image data from the digital color copying machine 90 side is processed, and differ respectively.

[0054] * When processing film reading data, it is block 251 first. Transform processing from R-G-B data to Y-Cr-Cb data and hue rotation processing by direct coordinate rotation processing are performed. Namely, [0055]

[Equation 1]

$$\begin{bmatrix} Y \\ Cr \\ Cb \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\theta & -\sin\theta \\ 0 & \sin\theta & \cos\theta \end{bmatrix} \times \begin{bmatrix} 0.299 & 0.587 & 0.114 \\ 0.701 & -0.587 & -0.114 \\ -0.299 & -0.587 & 0.886 \end{bmatrix} \times \begin{bmatrix} Rf' \\ Gf' \\ Bf' \end{bmatrix}$$

****** is performed.

[0056] Block 251 An output is each LUT252 of Y-Cr-Cb. It is inputted. This LUT252 It is CRT display 300. Thickness adjustment of the inside of color tone ready actuation, and a color, Brightness adjustment, Contrast adjustment actuation is performed. Brightness and contrast adjustment are LUT252 of Y data line here. Thickness adjustment of a color is LUT252 of a Cr-Cb data line. It can attain by making it change respectively.

[0057] Above LUT 252 An output is block 253,255. It is inputted. block 253 **** -- transform processing and film reading data from Y-Cr-Cb data to R-G-B data -- CRT display 300 Processing which carries out color correction to output data is performed. Namely, [0058]

[Equation 2]

$$\begin{bmatrix} R \\ G \\ B \end{bmatrix} = \begin{bmatrix} X_{11} & X_{12} & X_{13} \\ X_{21} & X_{22} & X_{23} \\ X_{31} & X_{32} & X_{33} \end{bmatrix} \times \begin{bmatrix} 1 & 1 & 0 \\ 1 & -0.50937 & -0.194208 \\ 1 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} Y' \\ Cr' \\ Cb' \end{bmatrix}$$

****** is performed. Moreover, block 255 In order to perform the above-mentioned color correction for every color space then and to heighten the color correction effectiveness, the above-mentioned coefficient-of-variation group [Xij] is chosen. From Y-Cr-Cb data, selection judges a color space and is attained.
[0059] Block 253 An output is LUT254. It is inputted and nonlinear transform processing is performed. This LUT254 It is prepared for every R-G-B data, and is a linear property to CRT display 300 to the reflection factor of a manuscript. Transform processing to a characteristic nonlinear property is performed. In addition, LUT254 An output minds a non-illustrated D/A converter and is CRT display 300. It is sent.
[0060] * It is block 251, when processing the reading data by the side of a copying machine and RGB data are sent from a copying machine 90 side. A unit-factor matrix is set to a coefficient matrix. Namely, [0061]
[Equation 3]

$$\begin{bmatrix} Y \\ Cr \\ Cb \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$

****** is performed. moreover, LUT252 **** -- the data which make I/O a linear are set.
[0062] Moreover, block 253 It is CRT display 300 about the RGB data from a copying machine. The processing changed into output color data (color-coordinate-system data), i.e., [0063]
[Equation 4]

$$\begin{bmatrix} Rc \\ Gc \\ Bc \end{bmatrix} = \begin{bmatrix} Z_{11} & Z_{12} & Z_{13} \\ Z_{21} & Z_{22} & Z_{23} \\ Z_{31} & Z_{32} & Z_{33} \end{bmatrix} \times \begin{bmatrix} Y \\ Cr \\ Cb \end{bmatrix}$$

It ******.
[0064] the case where CMY data are sent from a copying machine 90 side on the other hand -- block 251 a unit-factor matrix sets to a coefficient matrix -- having -- moreover, LUT252 **** -- the data which make I/O a linear are set. Moreover, block 253 It is CRT display 300 about the CMY data from a copying machine. The processing changed into output color data (color-coordinate-system data), i.e., [0065]
[Equation 5]

$$\begin{bmatrix} Rc \\ Gc \\ Bc \end{bmatrix} = \begin{bmatrix} P_{11} & P_{12} & P_{13} \\ P_{21} & P_{22} & P_{23} \\ P_{31} & P_{32} & P_{33} \end{bmatrix} \times \begin{bmatrix} Rx' \\ Gx' \\ Bx' \end{bmatrix}$$

It ******.
[0066] [4-3] the root by the side of a copying machine, next said alignment section 230 between RGB from -- the root by the side of a copying machine is explained. Block 230 An output is LUT260. It is inputted. This LUT250 Normalization amendment processing, A negative positive reversal process and RGB independent color tone ready processing are performed. Normalization amendment processing is the MIN value of RGB each signal, and is processing to which it is made for the output width of face to an input to turn into predetermined width of face. A negative positive reversal process is processing which changes the reading data of a negative film into POJIDE-TA, and is changed into linear data to the reflection factor of a manuscript. RGB independent color tone ready processing is CRT display 300. It is the processing which operates input / output relation by independence of RGB Rhine by color tone ready actuation, and is a display 300. The operated result is fed back.
[0067] LUT260 An output is block 261. It is inputted. block 261 **** -- transform processing from R-G-B data

to Y-Cr-Cb data and hue rotation processing by direct coordinate rotation processing are performed. Namely,
[0068]
[Equation 6]

$$\begin{bmatrix} Y \\ Cr \\ Cb \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos\theta & -\sin\theta \\ 0 & \sin\theta & \cos\theta \end{bmatrix} \times \begin{bmatrix} 0.299 & 0.587 & 0.114 \\ 0.701 & -0.587 & -0.114 \\ -0.299 & -0.587 & 0.886 \end{bmatrix} \times \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$

It ******. In addition, direct coordinate rotation processing is CRT display 300. The hue angle of rotation theta decided by color tone ready actuation is fed back.
[0069] Block 261 An output is each LUT262 of Y-Cr-Cb. It is inputted. This LUT262 It is CRT display 300. Thickness adjustment of the inside of color tone ready actuation, and a color, Brightness adjustment, The result of having performed contrast adjustment actuation is fed back.
[0070] Above LUT 262 An output is block 263,265. It is inputted. block 263 **** -- transform processing and film reading data from Y-Cr-Cb data to R-G-B data -- the printer section 950 of a copying machine Processing which carries out color correction to output data is performed. Namely, [0071]
[Equation 7]

$$\begin{bmatrix} R \\ G \\ B \end{bmatrix} = \begin{bmatrix} Y_{11} & Y_{12} & Y_{13} \\ Y_{21} & Y_{22} & Y_{23} \\ Y_{31} & Y_{32} & Y_{33} \end{bmatrix} \times \begin{bmatrix} 1 & 1 & 0 \\ 1 & -0.50937 & -0.194208 \\ 1 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} Y \\ Cr \\ Cb \end{bmatrix}$$

It ******. Moreover, block 265 In order to perform the above-mentioned color correction for every color space then and to heighten the color correction effectiveness, the above-mentioned coefficient-of-variation group [Yij] is chosen. From Y-Cr-Cb data, selection judges a color space and is attained.
[0072] Block 263 An output is block 264. It is inputted into principal direction variable power, migration, and the continuous-shooting processing section, and is processed. These output data are drivers 234. It minds and is sent to a copying machine 90 side. On the other hand, the data sent from a copying machine 90 side are a receiver 234. It minds and they are the Lord and the subdata-conversion section 233. It minds and is said selector 232. It is sent. This Lord and subdata-conversion section 233 The number of data sent from a copying machine 90 side is said memory 240-242 for a display. Since many, it is the block established for adjustment.
[0073]
[5] Control of a system (refer to flow chart)
Next, it is based on the flow chart shown in drawing 14 - drawing 18, and control in preview mode is explained.
[0074] [5-1] whole control: -- drawing 12 -- first -- drawing 8 a screen -- setting -- copying machine side preview mode switch 316 If turned on (S11;YES) this preview mode switch 316 Drawing 9 -, while inverse video is carried out like drawing 11 a copying machine 90 side -- receiving -- " -- the data read by the read station 900 of a copying machine are sent to the printer section 950 of this copying machine -- as --" drawing 3 The selector section 415 the purport which should be switched -- it is ordered (S13). It corresponds to this command and they are steps S521 and S523 of drawing 17 at a copying machine 90 side. It is the selector section 415 so that it may be shown. A change-over is performed by the control signal 1.
[0075] Moreover, the above-mentioned switch 316 ON (S11;YES) It corresponds, and the selector 232 (drawing 6) of film scanner equipment 30 is switched so that the data (block 233 data from a side) from a copying machine 90 side may be received (S15).
[0076] Preview mode switch 316 It is the above 2 by ON. Selector 415,232 of ** In the condition of having been respectively switched like the above, it is image SUKYANKI of drawing 19. - 353 ON transmits a scanning demand to a copying machine side (S23). (S21;YES) It corresponds to this and is the read station 900 of a copying machine. They are steps S541 and S543 of drawing 17. It is the manuscript base 901 so that it may be shown. Processing which reads the upper manuscript and generates RGB data is performed. In addition, the scanning actuation in this case is 1. A time is sufficient.
[0077] moreover, above-mentioned SUKYANKI -353 ON (S21;YES) corresponding -- a copying machine 90 side -- receiving -- " -- the RGB data read by the read station 900 of a copying machine are sent to the film scanner equipment 30 side as it is -- as --" drawing 3 Driver 450 it should be made active -- a purport command is

carried out (S25). It corresponds to this command and they are steps S531 and S533 of drawing 17 at a copying machine 90 side. It is a driver 450 by the control signal 3 so that it may be shown. It is activated. In addition, it stands by until the incorporation of the RGB data transmitted from a copying machine 90 side is completed after this (S31).
[0078] Next, when the incorporation of the RGB data transmitted from a copying machine side is completed (S31;YES), the transform coefficient for a display for RGB data [Zij] is drawing 6. Block 253 It is set (S33). Moreover, the display based on the incorporated data is CRT display 300 like the above. It is carried out upwards (S35).
[0079] [5-2] Input process : drawing 14 (drawing 13)
Step S41 Input process is then performed. This processing is processing which sets up the mode corresponding to the screen switch switched on based on the input of the screen switch (refer to drawing 8) specified with cursor (S101;YES), as shown in drawing 14.
[0080] For example, image adjustment switch 305 When turned on, (S111;YES) and image adjustment mode are set (S113). thereby -- image adjustment switch 305 while inverse video is carried out like drawing 10 -- pull down menu display area 303 **** -- 3031 is displayed and the color adjustment of the switch group for image adjustment etc. is attained. In addition, if an end switch 3032 is turned on in image adjustment mode, the read image will be displayed on a screen in a color equivalent to the color which should be reproduced on hard copy. It is behind based on drawing 15 and this processing is explained in full detail.
[0081] Trimming switch 306 When turned on, (S121;YES) and TORIMINGUMO-DO are set (S123). Thereby, it is the trimming switch 306. Inverse video is carried out like drawing 11. furthermore, pull down menu display area 304 **** -- the switch group 3041 for trimming (trimming menu) displays -- having -- moreover, image field 301 **** -- the trimming frame 3011 is displayed. In addition, processing by TORIMINGUMO-DO is later based and explained to drawing 16.
[0082] Expansion continuous-shooting switch 307 When turned on, (S131;YES) and an expansion continuous shooting mode are set (S133). Output check switch 309 When turned on, (S141;YES) and output check mode are set (S143). Thereby, it is the output check switch 309. Drawing 9 Inverse video is carried out like. Furthermore, in order to show the relation between the form for print-out, and an image, the form frame 3012 is displayed. In addition, step S153 is a step which shows the set in the mode of others corresponding to ON of other switches etc. collectively.
[0083] [5-3] Image adjustment processing : if image adjustment mode is set like the drawing 15 above-mentioned step S113, it is image adjustment processing (S51). It performs. First, it is the pull down menu display area 303 like drawing 10. 3031 (image adjustment menu), such as a switch group for image adjustment, is displayed (S201). Furthermore, ON of switches for making colors, such as Y, M, C, D, and S, fluctuate by 3031, such as this switch group, performs processing (color tone ready processing) for adjusting the color of an image according to it (S211). (S203 / selection)
[0084] Moreover, when an end switch 3032 is turned on on the screen of drawing 10, they are the image adjustment menus 3031 and 3032. It is supposed that it is non-display (S221). Furthermore, a scanning demand (S223), the color tone ready result (S225) in step S211, and a selection demand (S227) of YMC Rhine are transmitted to a copying machine 90 side, respectively.
[0085] It corresponds to the above-mentioned scanning demand (S223), and they are steps S541 and S543 of drawing 17 at a copying machine 90 side. It is the manuscript base 901 so that it may be shown. Processing which reads the upper manuscript, generates RGB data and generates YMC data based on this is performed. In addition, the scanning actuation in this case is 3 because of YMC data generation. It is [time] necessary. It corresponds to reception of the data of the above-mentioned color tone ready result (S225), and they are steps S561 and S563 of drawing 18 at a copying machine 90 side. It is drawing 3 so that it may be shown. gamma amendment section 445 Processing which amends data by the data of the above-mentioned color tone ready result is performed. It corresponds to a selection demand (S227) of above-mentioned YMC Rhine, and they are steps S551 and S553 of drawing 18 at a copying machine 90 side. It is drawing 3 by the control signal 2 so that it may be shown. Driver 460 It is activated. In this way, if processing for making YMC data transmit to the film scanner equipment 30 side from a copying machine 90 side is performed, it will stand by until the incorporation of the YMC data transmitted from a copying machine 90 side is completed (S231).
[0086] Next, when the incorporation of the above-mentioned YMC data is completed (S231;YES), the transform

coefficient for a display for YMC data [Pij] is drawing 6. Block 253 It is set (S233). Furthermore, the display based on the incorporated data is CRT display 300 like the above. It is carried out upwards (S235).

[0087] [5-4] Trimming processing : if TORIMINGUMO-DO is set like step S123 of drawing 16 aforementioned drawing 14, it is trimming processing (S53). It performs. First, said pull down menu display area 304 Like drawing 11, the switch group 3041 for trimming (trimming menu) is displayed (S301). moreover, image field 301 **** -- the trimming frame 3011 freely set up by cursor is displayed, and a setup of a trimming field is enabled.

[0088] Next, when a setup of a trimming field is completed (S311;YES), the relation of the trimming field and form which ON of the output check switch 309 stood by, and were set up when turned on (S313;YES) is CRT display 300. It is displayed (S315).

[0089] [5-5] Command reception : the drawing 17 - drawing 18 command reception is processing performed by CPU2 of a copying machine 90 according to the command transmitted from the film scanner equipment 30 side. Since said drawing 12 - drawing 16 explained and reference was made about processing of steps S521-S563, explanation here is omitted.

[0090] From the film scanner equipment 30 side, transmission of a print request (demand transmitted corresponding to the input of the copy key 355 of drawing 19) performs copy actuation processing (S573) (S571;YES). Namely, manuscript base 901 After the upper manuscript is read, and RGB data are generated and being changed into YMC data, image formation to a form top is performed based on these YMC data. In addition, it is drawing 3 when the aforementioned image adjustment processing is performed. gamma amendment section 445 As data, the data amended at said step S563 are adopted. Thereby, print-out in a color equivalent to the color adjusted on the screen is realized.

[0091]

[Effect of the Invention] In this invention, if preview mode is set up, the data for a print which change color-separation data and are obtained will be changed into the data for a display, and will be inputted into a display means. Therefore, the image displayed with a display means has image quality equivalent to the image for print-out. For this reason, even when using this image formation equipment for the application as which the repeatability of a delicate color is required, a monitor can fully be carried out.

[0092] Moreover, two preview modes are prepared and he is trying to be properly used in invention corresponding to the 2nd purpose according to an application. Although three image reading actuation is generally required in order to obtain the data for a print (Y, M, C data), by this 2nd invention, the repeatability of delicate colors, such as trimming, can carry out a monitor simply in one image reading actuation, for example to carry out the monitor of the image for the application which is not demanded.

[Translation done.]

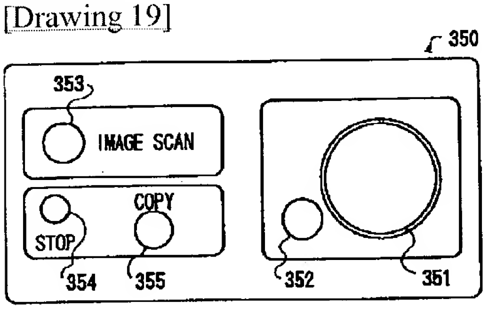
* NOTICES *

Japan Patent Office is not responsible for any damages caused by the use of this translation.

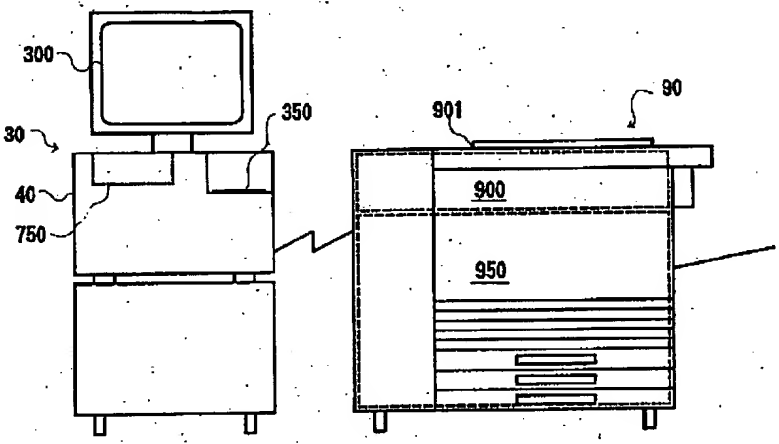
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

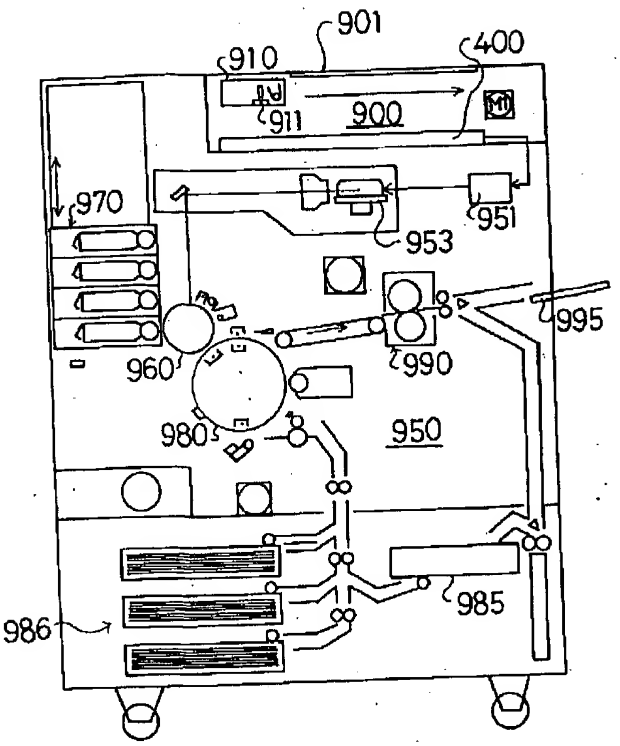
[Drawing 19]


350
353
IMAGE SCAN
COPY
STOP
354
355
352
351

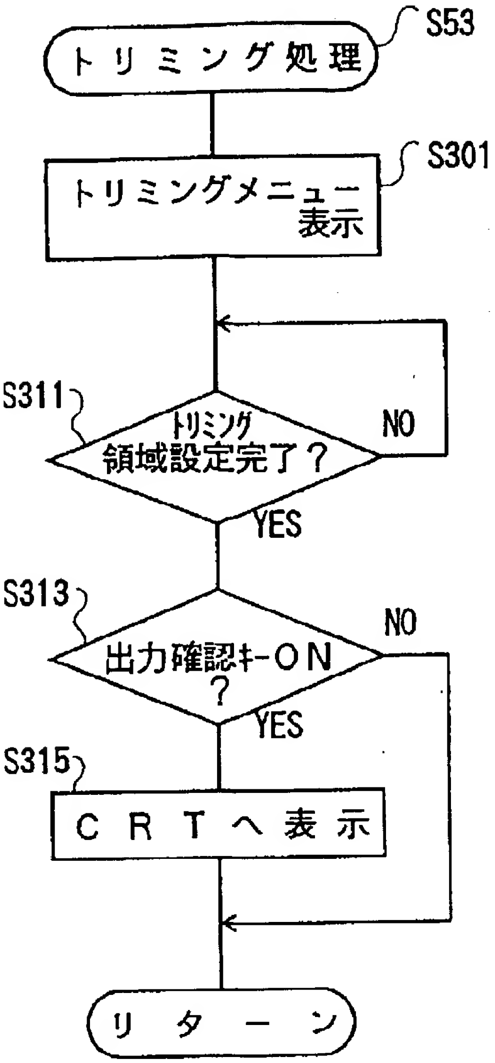
[Drawing 1]


300
30
40
750
350
901
90
900
950

[Drawing 2]

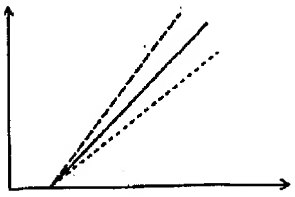

901
910
400
911
900
M1
970
951
953
995
960
990
950
980
985
986

[Drawing 16]

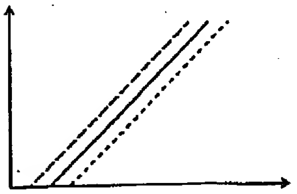

S53
トリミング処理
S301
トリミングメニュー表示
S311
トリミング領域設定完了？
NO
YES
S313
出力確認ｷ-ON？
NO
YES
S315
CRTへ表示
リターン

[Drawing 20]

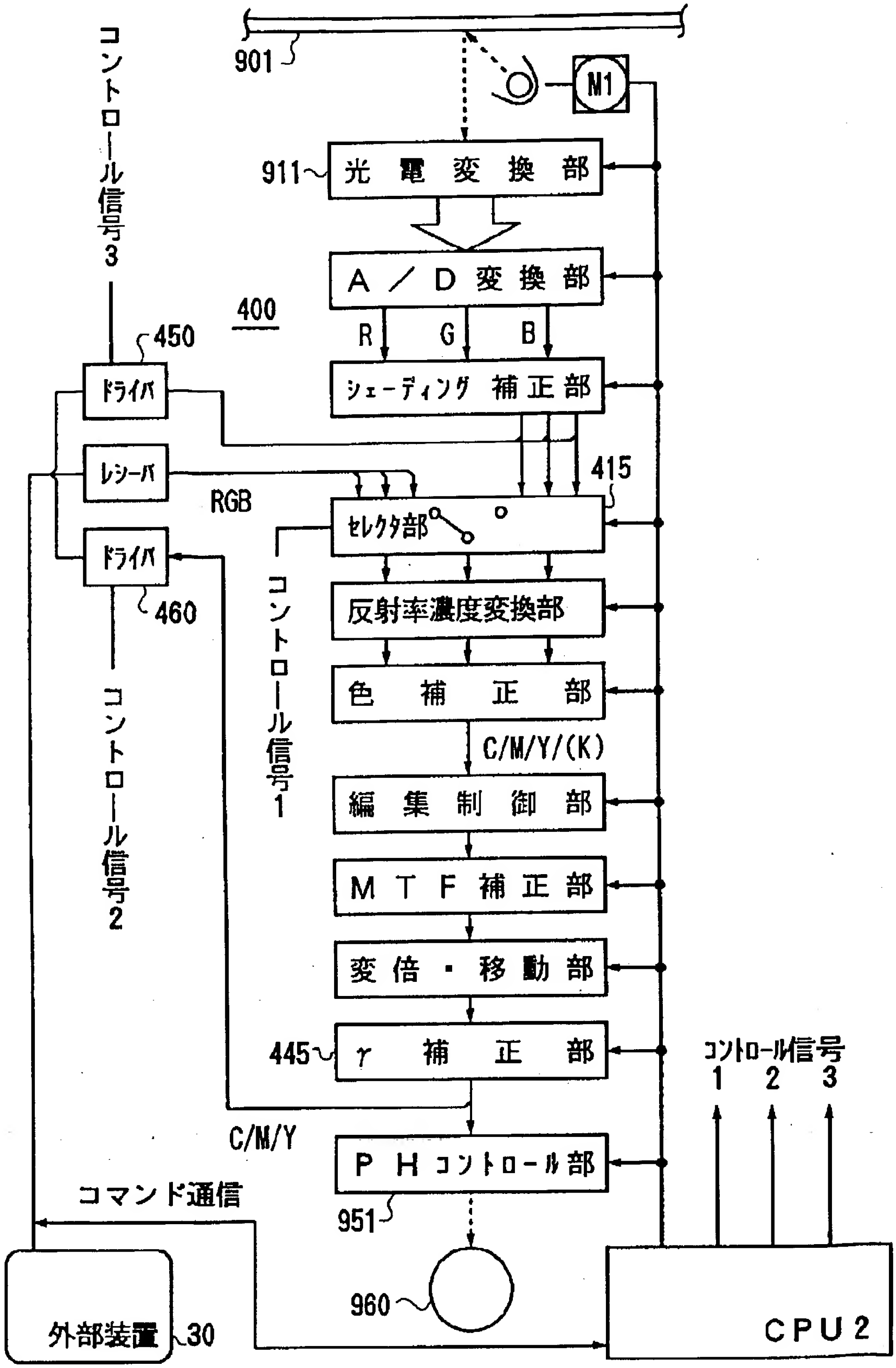
（a）傾きの変更



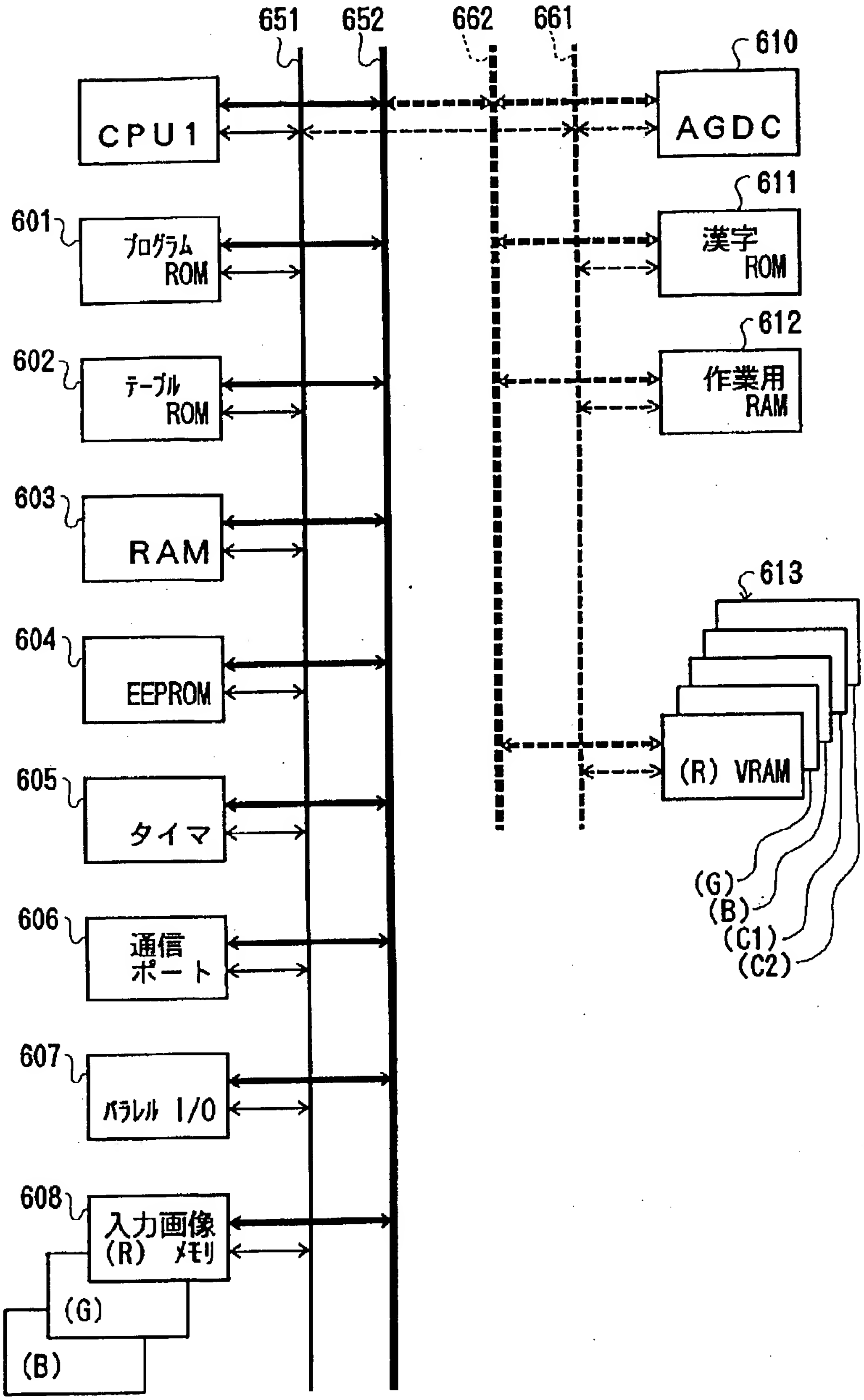
（b）バイアスレベルの変更



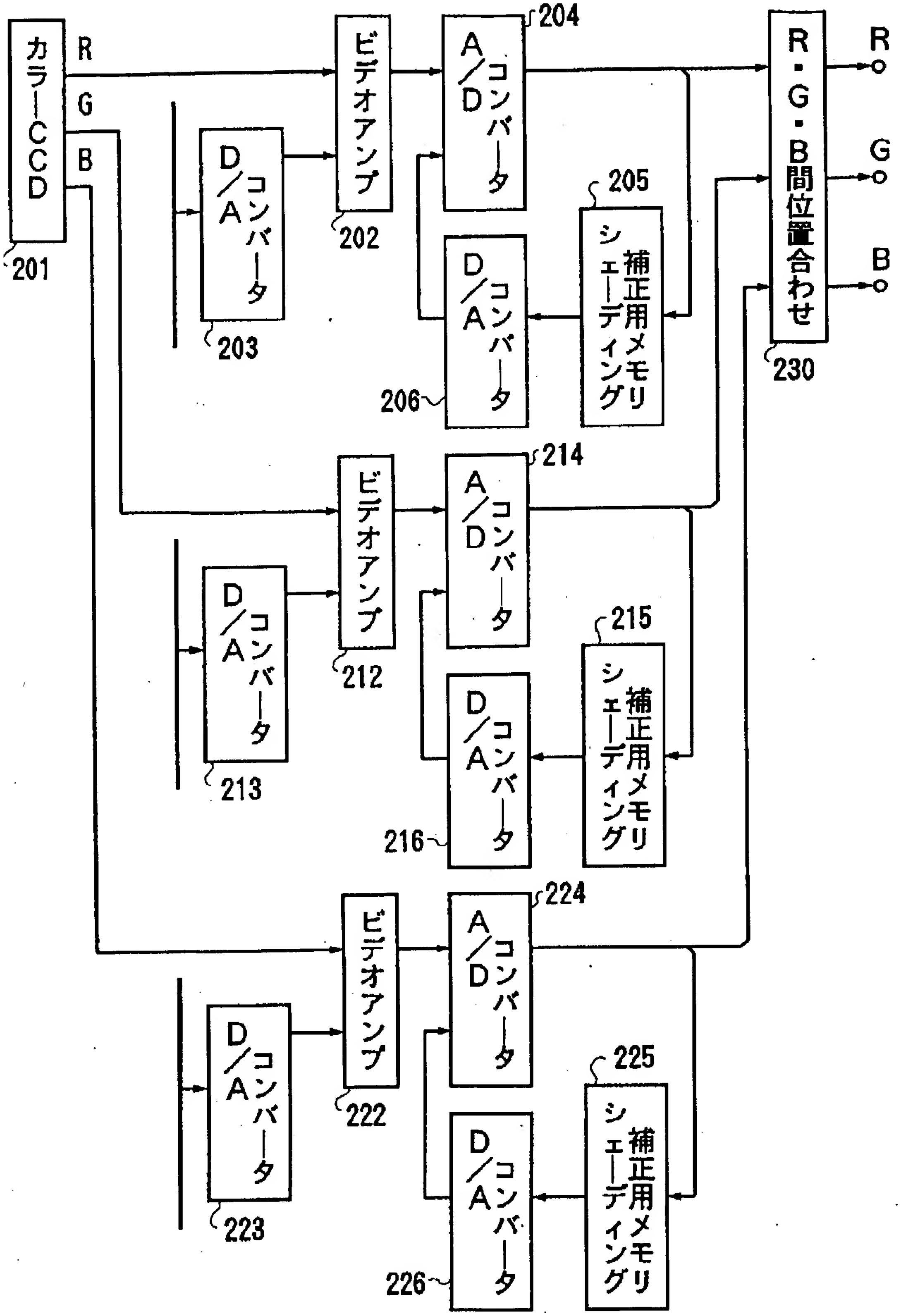
[Drawing 3]


コントロール信号3
901
M1
911
光電変換部
A／D変換部
400
R
G
B
450
ドライバ
シェーディング補正部
レシーバ
415
RGB
セレクタ部
ドライバ
460
コントロール信号1
反射率濃度変換部
コントロール信号2
色補正部
C/M/Y/(K)
編集制御部
MTF補正部
変倍・移動部
445
γ補正部
コントロール信号
1
2
3
C/M/Y
PHコントロール部
コマンド通信
951
960
外部装置
30
CPU 2

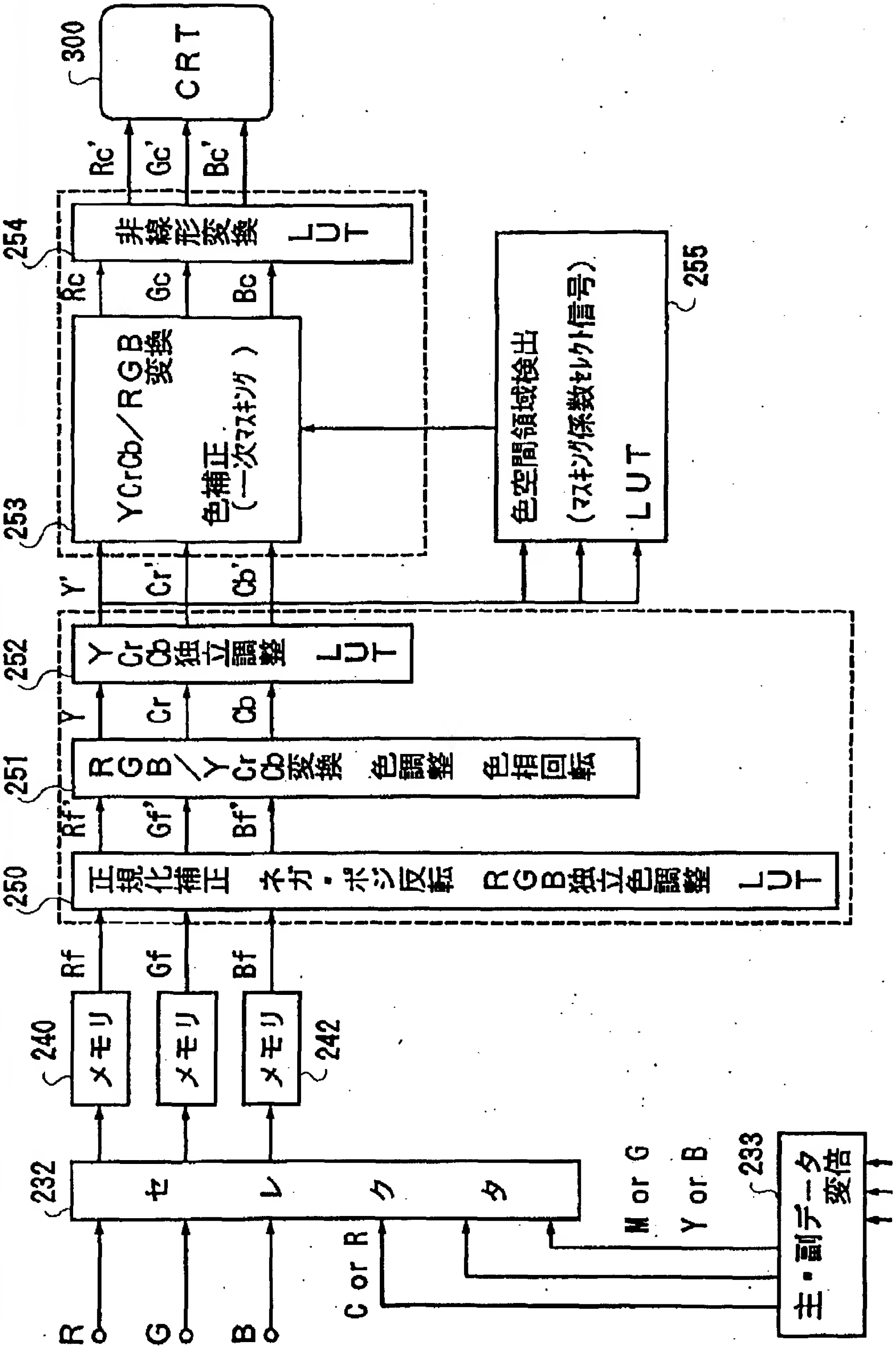
[Drawing 4]


651
652
662
661
610
CPU1
AGDC
611
601
プログラム ROM
漢字 ROM
612
602
テーブル ROM
作業用 RAM
603
RAM
613
604
EEPROM
605
タイマ
(R) VRAM
(G)
(B)
(C1)
(C2)
606
通信 ポート
607
パラレル I/O
608
入力画像 (R) メモリ
(G)
(B)

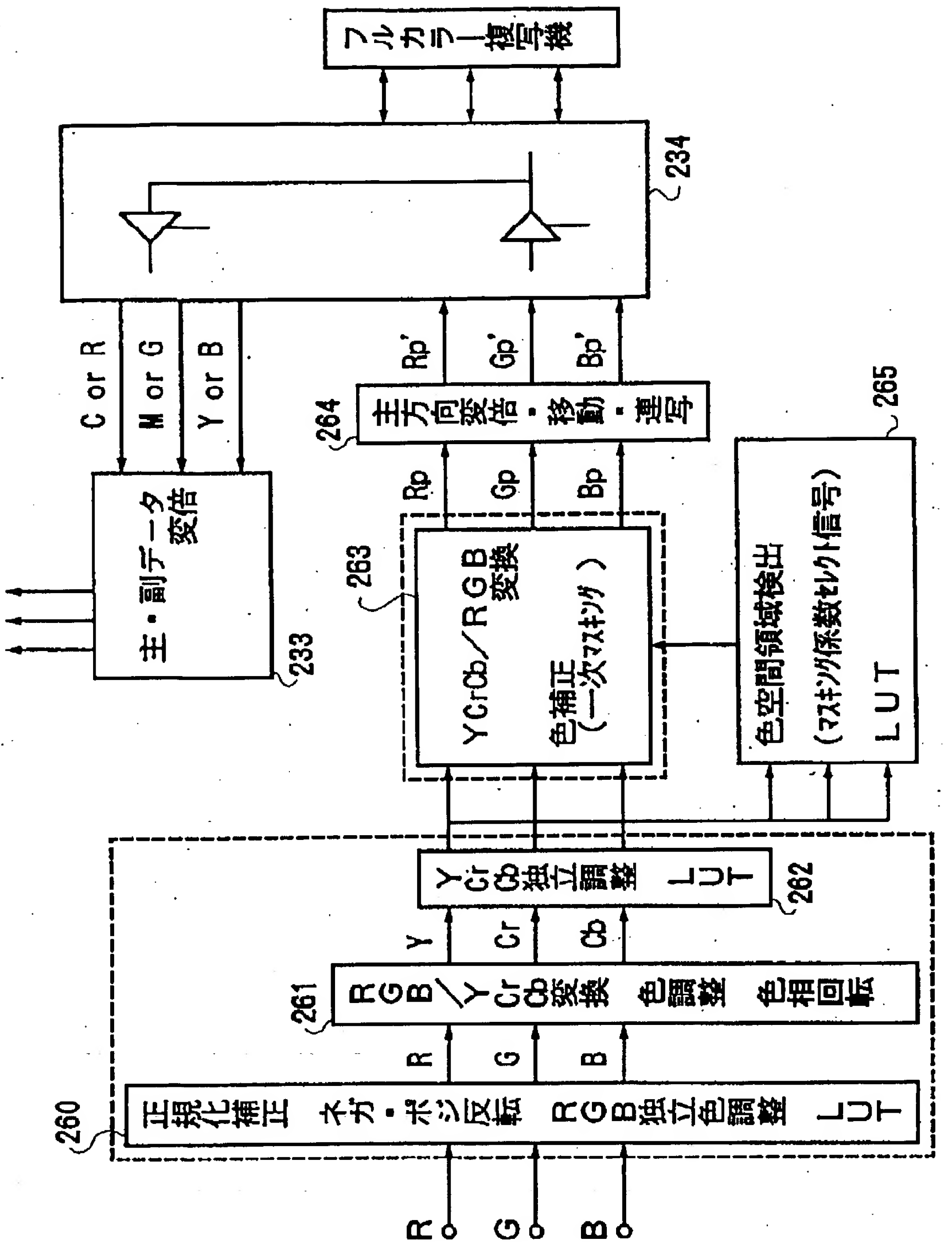
[Drawing 5]


カラーCCD
R
G
B
201
ビデオアンプ
202
D/Aコンバータ
203
A/Dコンバータ
204
シェーディング補正用メモリ
205
D/Aコンバータ
206
ビデオアンプ
212
D/Aコンバータ
213
A/Dコンバータ
214
シェーディング補正用メモリ
215
D/Aコンバータ
216
ビデオアンプ
222
D/Aコンバータ
223
A/Dコンバータ
224
シェーディング補正用メモリ
225
D/Aコンバータ
226
R・G・B間位置合わせ
230
R
G
B

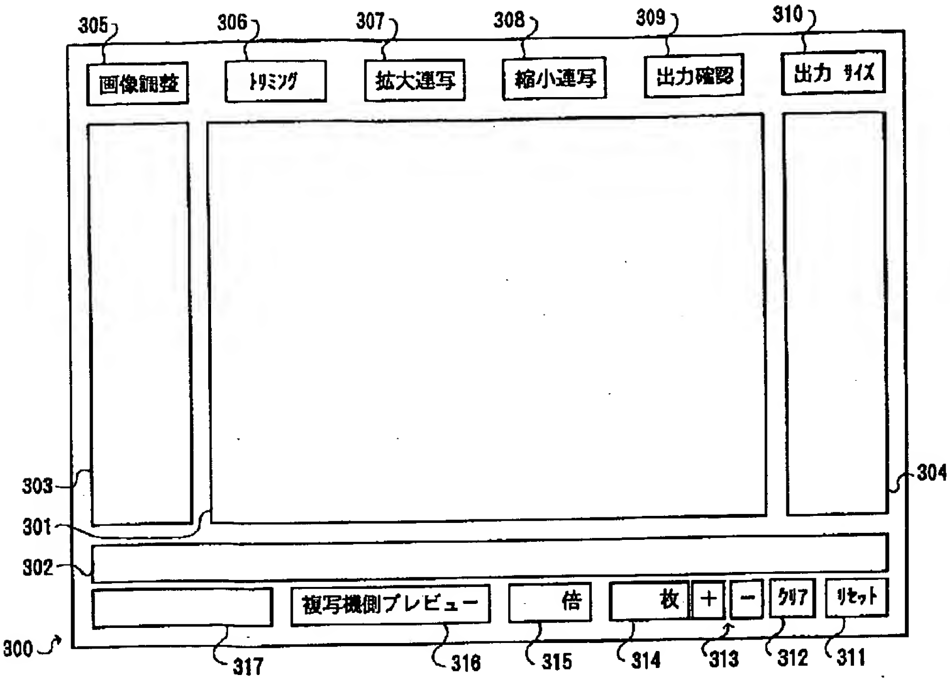
[Drawing 6]


R
G
B
C or R
M or G
Y or B
232
セレクタ
233
主・副データ変信
240
242
メモリ
メモリ
メモリ
Rf
Gf
Bf
250
正規化補正　ネガ・ポジ反転　RGB独立色調整　LUT
Rf'
Gf'
Bf'
251
RGB／YCrCb変換　色調整　色相回転
Y
Cr
Cb
252
YCrCb独立調整　LUT
Y'
Cr'
Cb'
253
YCrCb／RGB変換
色補正
（一次マスキング）
255
色空間領域検出
（マスキング係数セレクト信号）
LUT
Rc
Gc
Bc
254
非線形変換　LUT
Rc'
Gc'
Bc'
300
CRT

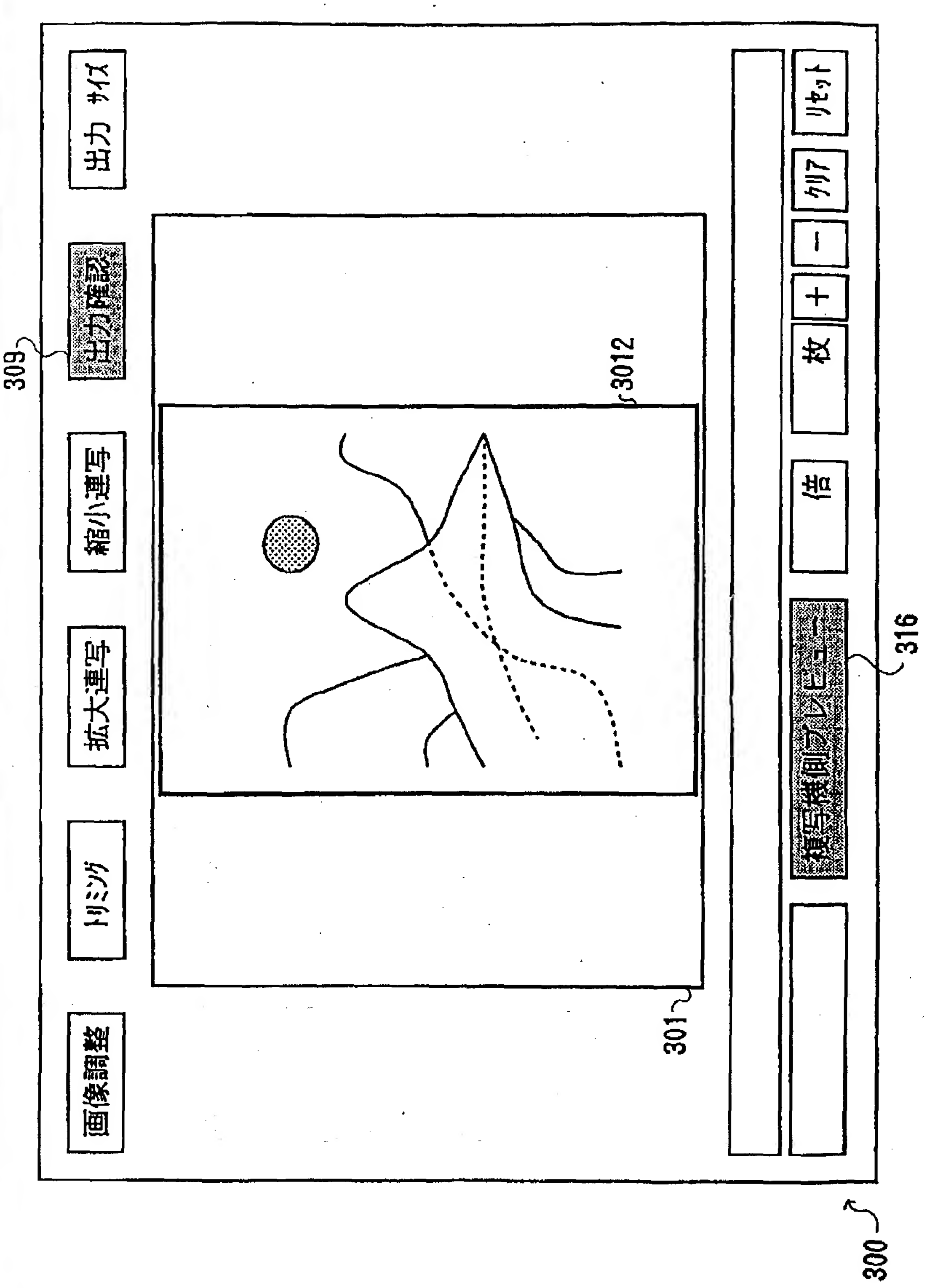
[Drawing 7]


R
G
B
260
正規化補正　ネガ・ポジ反転　RGB独立色調整　LUT
R
G
B
261
RGB／YCrCb変換　色調整　色相回転
Y
Cr
Cb
262
YCrCb独立調整　LUT
263
YCrCb／RGB変換
色補正（一次マスキング）
265
色空間領域検出
（マスキング係数セレクト信号）
LUT
Rp
Gp
Bp
264
主方向変倍・移動・連写
Rp'
Gp'
Bp'
234
フルカラー複写機
C or R
M or G
Y or B
233
主・副データ変倍

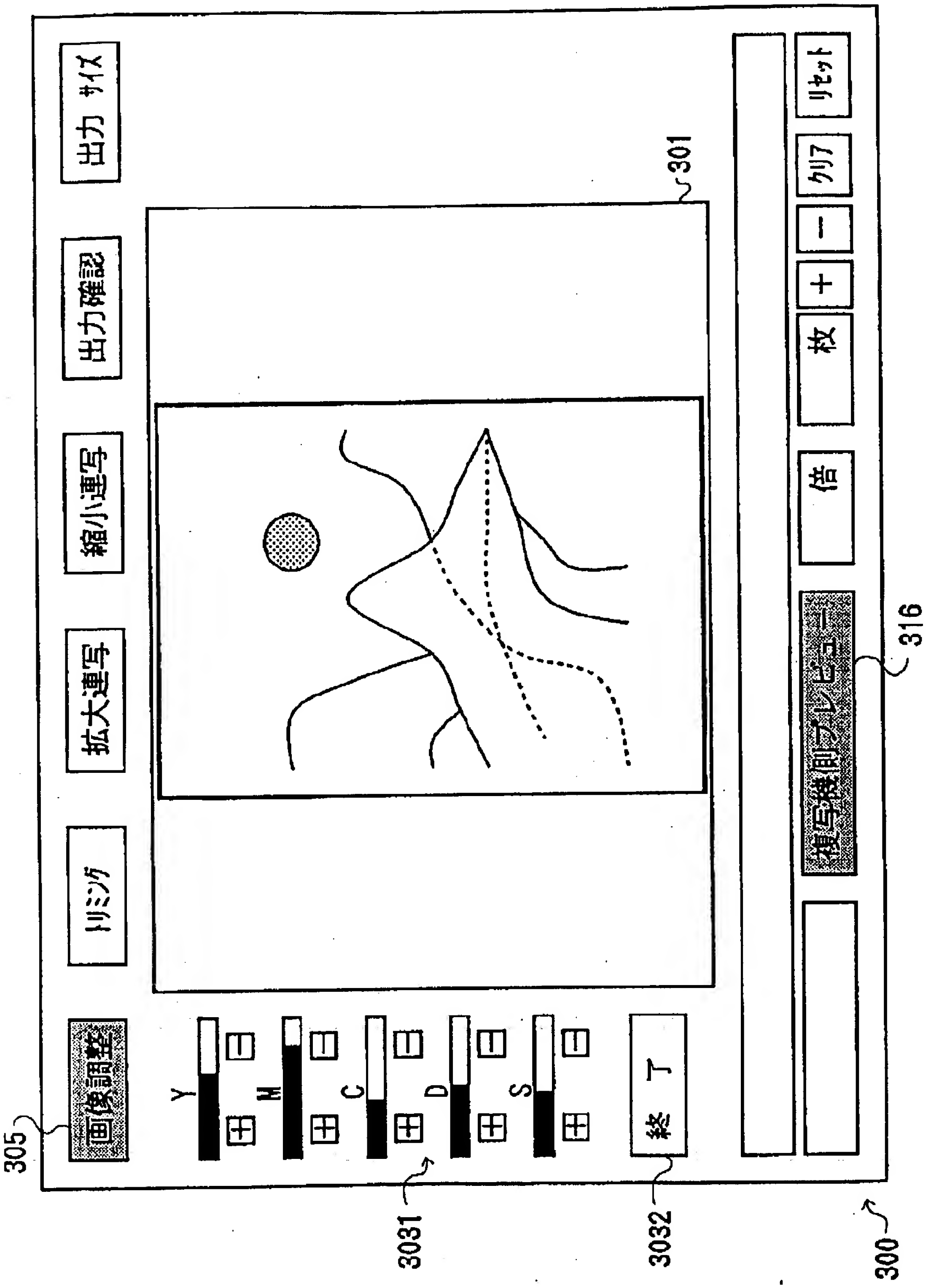
[Drawing 8]


305
画像調整
306
トリミング
307
拡大連写
308
縮小連写
309
出力確認
310
出力 サイズ
303
301
302
304
300
複写機側プレビュー
倍
枚
+
−
クリア
リセット
317
316
315
314
313
312
311

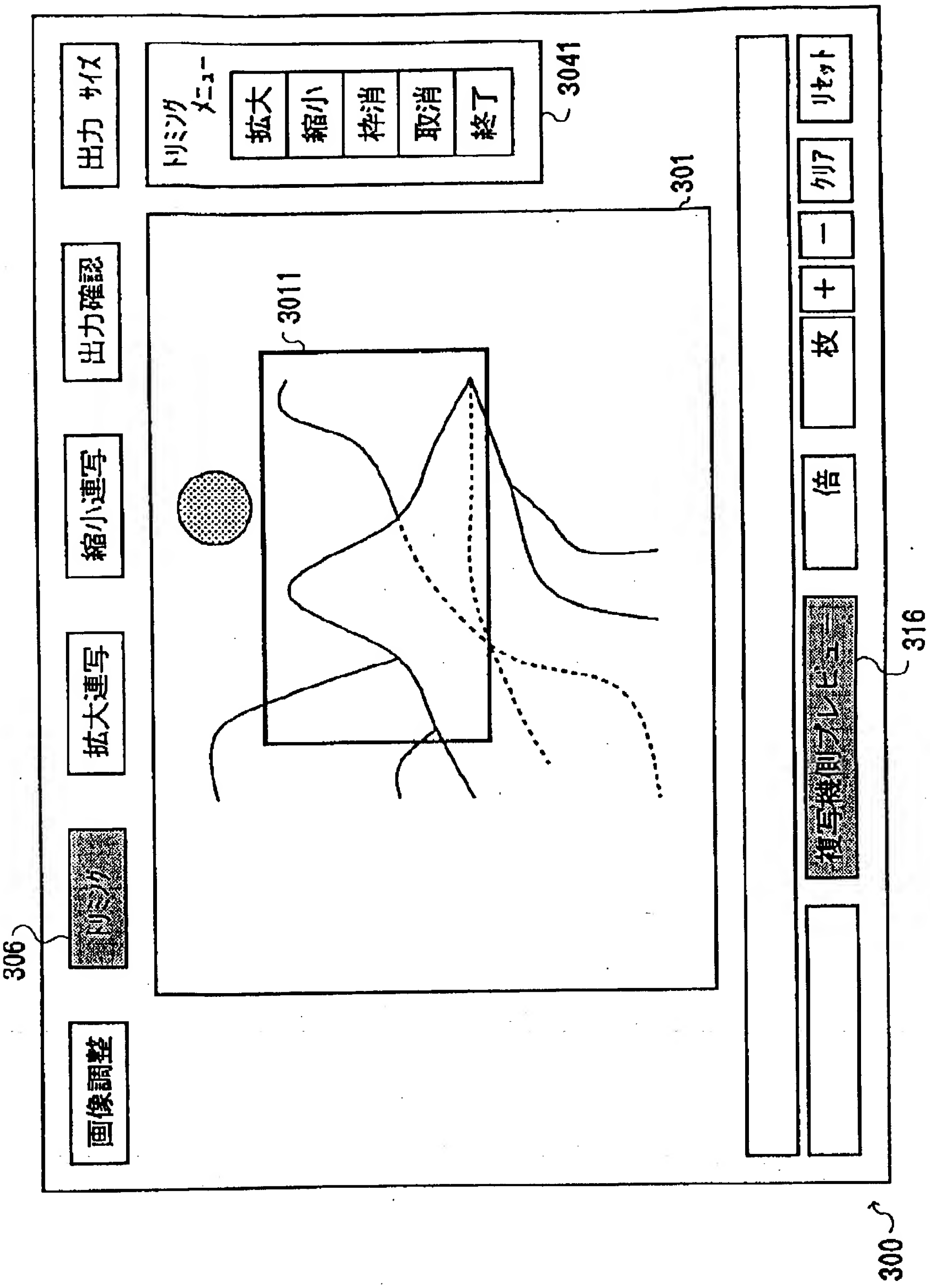
[Drawing 9]


画像調整
トリミング
拡大連写
縮小連写
出力確認
出力サイズ
複写機側プレビュー
倍
枚
+
−
クリア
リセット
300
301
309
316
3012

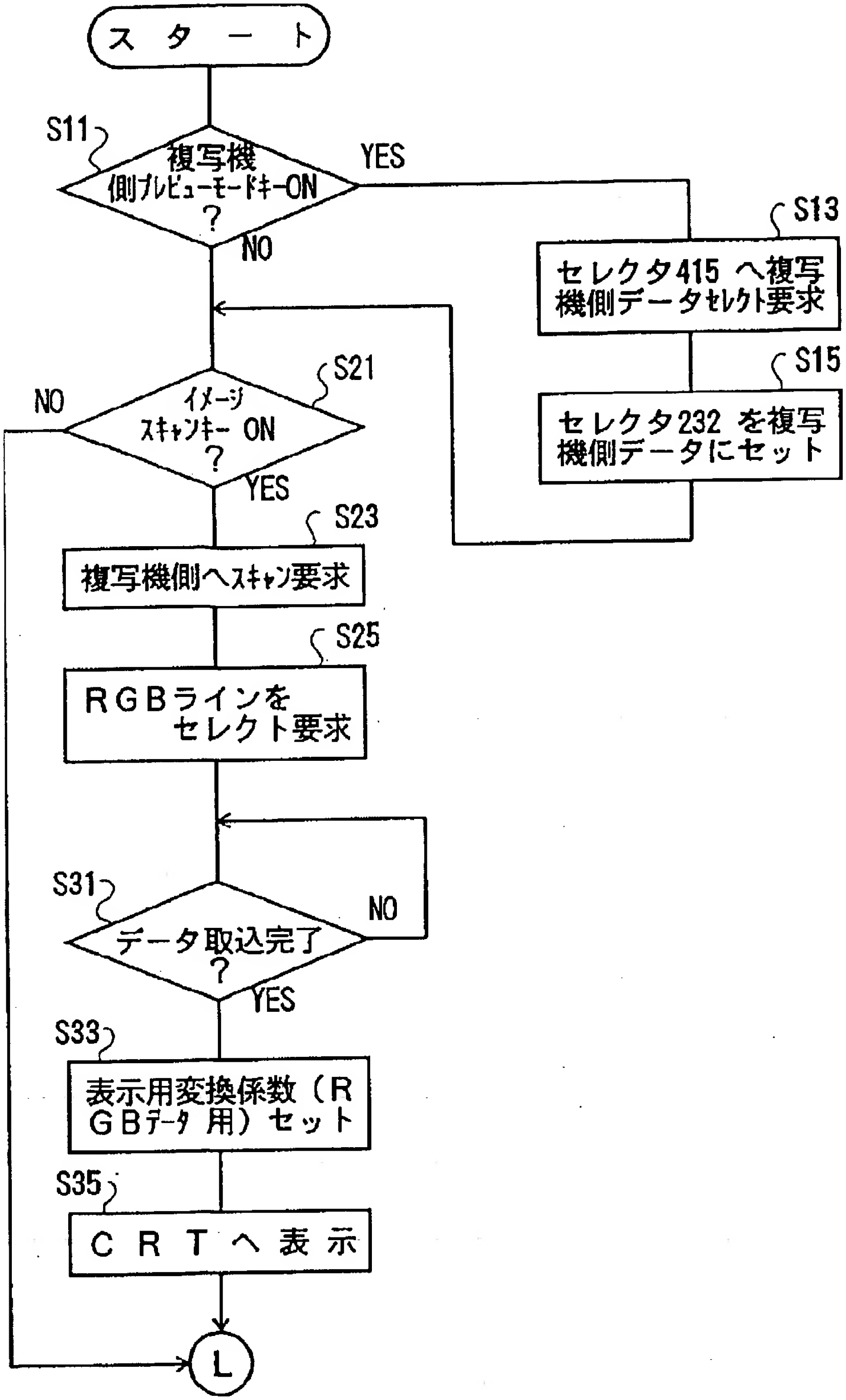
[Drawing 10]


画像調整
トリミング
拡大連写
縮小連写
出力確認
出力 サイズ
Y
M
C
D
S
⊞
⊟
終 了
複写範囲プレビュー
倍
枚
+
−
クリア
リセット
305
301
316
3031
3032
300

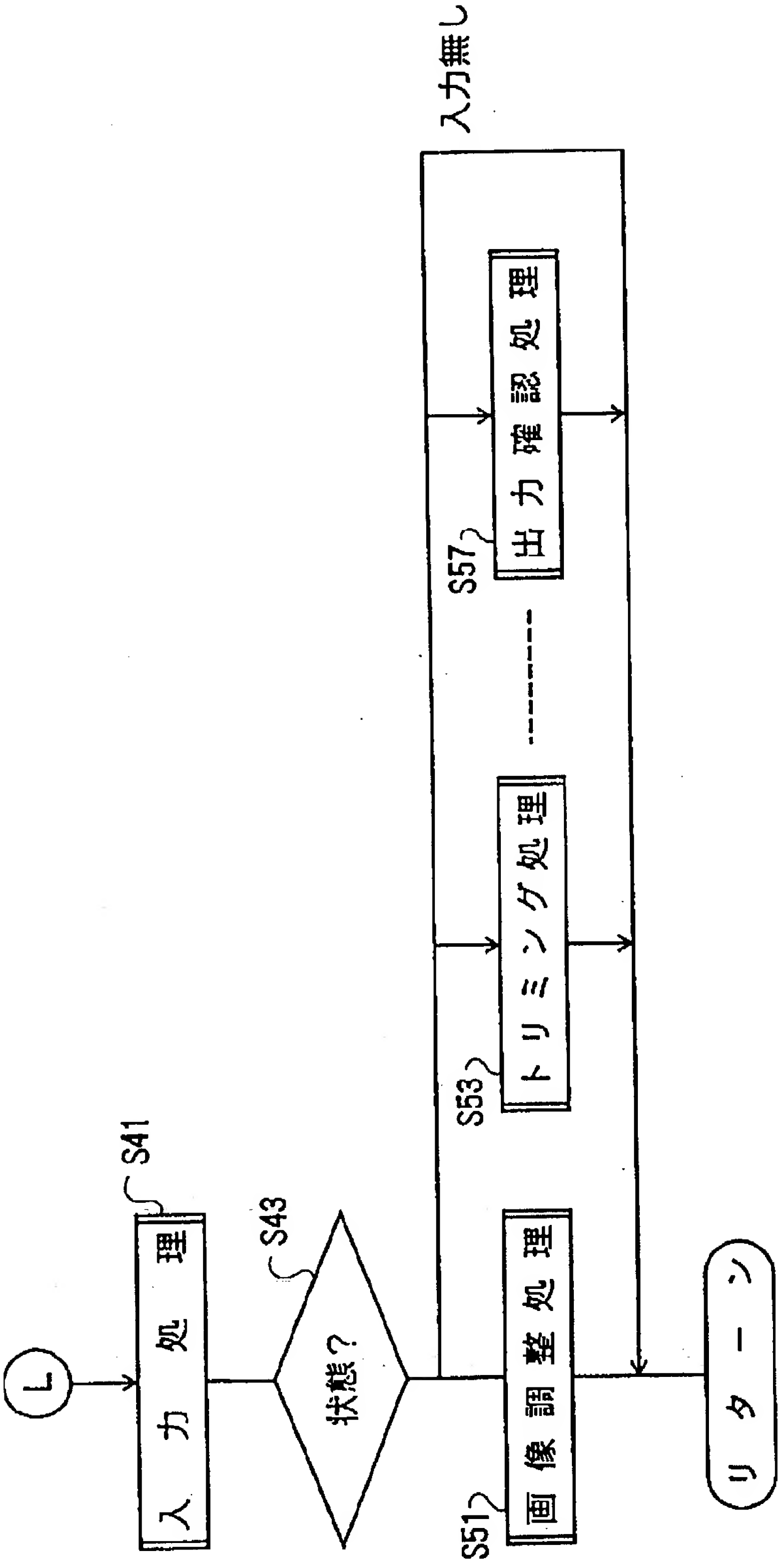
[Drawing 11]


出力サイズ
出力確認
縮小連写
拡大連写
トリミング
画像調整
トリミングメニュー
拡大
縮小
枠消
取消
終了
3041
301
3011
306
リセット
クリア
−
＋
枚
倍
複写機側プレビュー
316
300

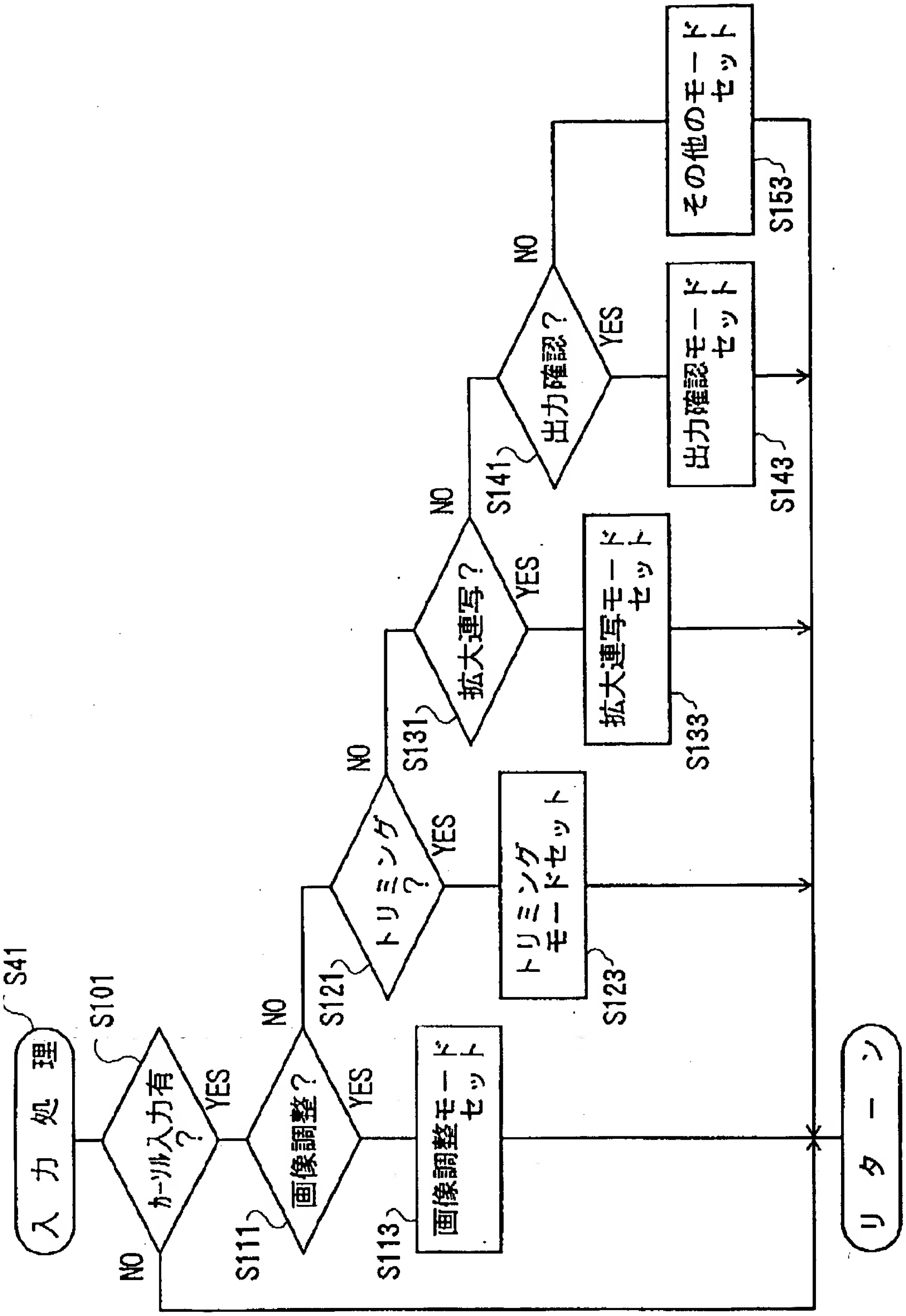
[Drawing 12]


スタート
S11
複写機側ﾌﾟﾚﾋﾞｭｰﾓｰﾄﾞｷｰON？
YES
NO
S13
セレクタ415へ複写機側データｾﾚｸﾄ要求
S15
セレクタ232を複写機側データにセット
S21
ｲﾒｰｼﾞｽｷｬﾝｷｰ ON？
NO
YES
S23
複写機側へｽｷｬﾝ要求
S25
ＲＧＢラインをセレクト要求
S31
データ取込完了？
NO
YES
S33
表示用変換係数（ＲＧＢﾃﾞｰﾀ用）セット
S35
ＣＲＴへ表示
L

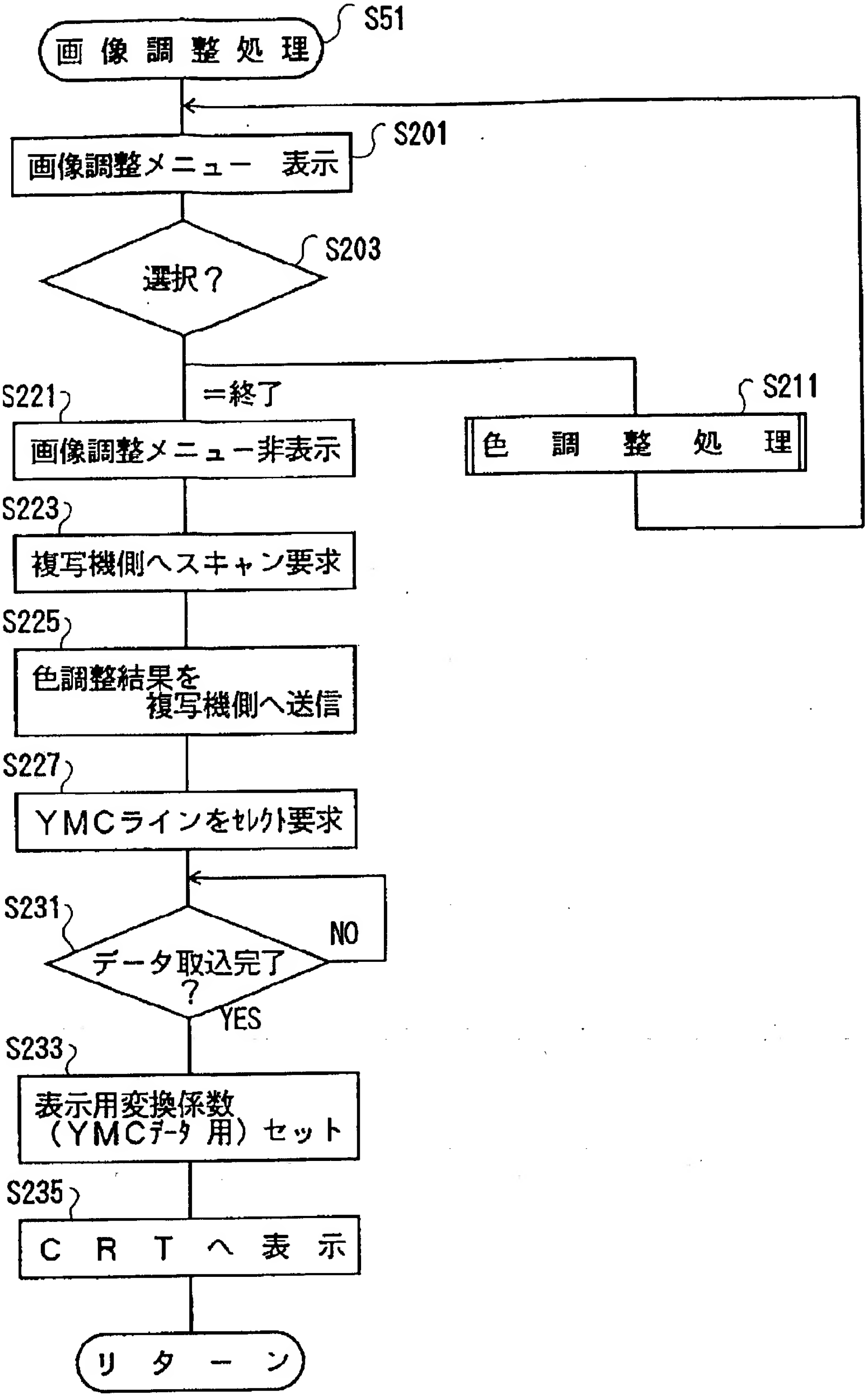
[Drawing 13]


L
S41
入力処理
S43
状態？
入力無し
S51
画像調整処理
S53
トリミング処理
S57
出力確認処理
リターン

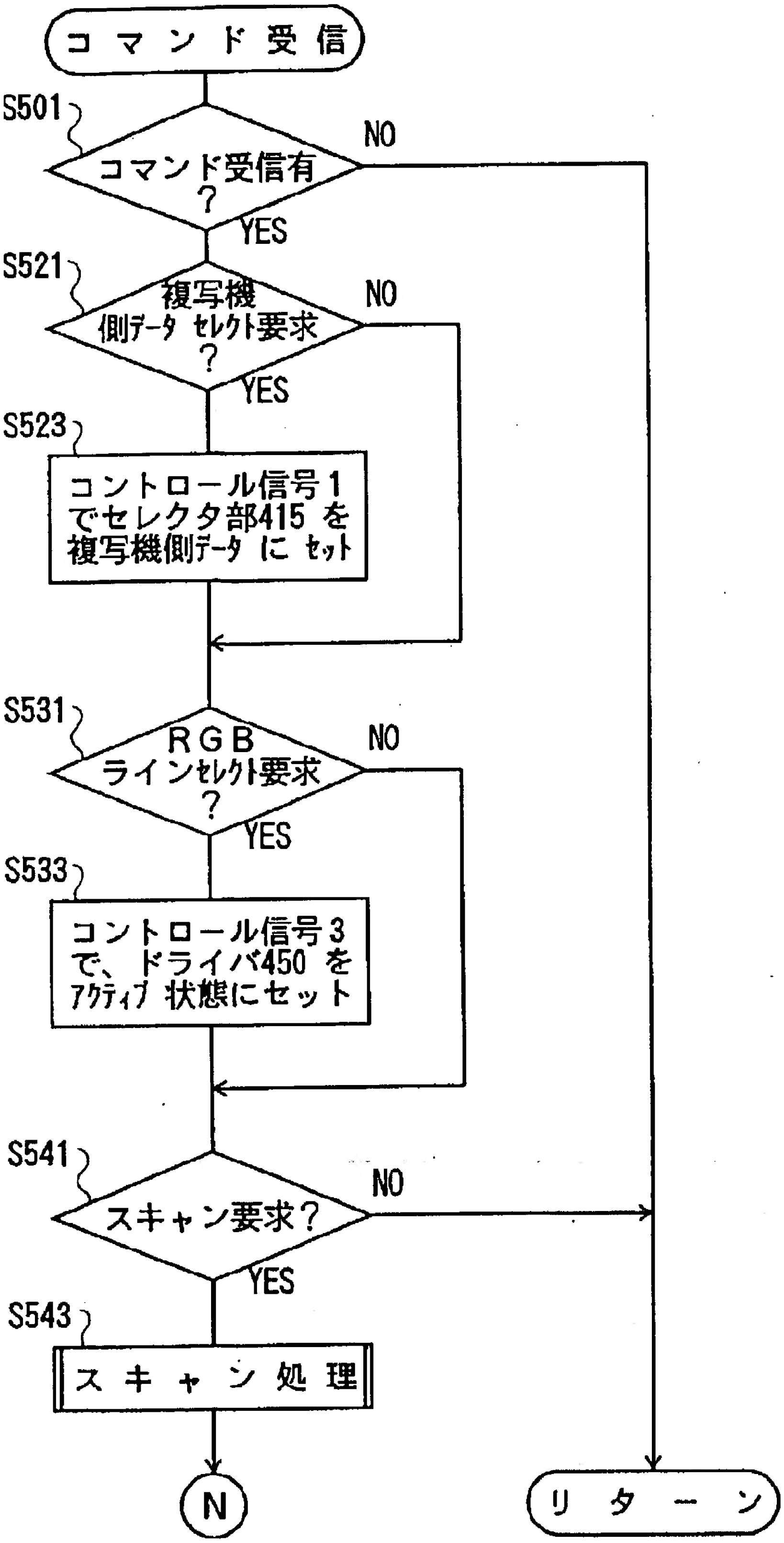
[Drawing 14]


S41
入力処理
S101
カーソル入力有？
YES
NO
S111
画像調整？
YES
NO
S113
画像調整モードセット
S121
トリミング？
YES
NO
S123
トリミングモードセット
S131
拡大連写？
YES
NO
S133
拡大連写モードセット
S141
出力確認？
YES
NO
S143
出力確認モードセット
S153
その他のモードセット
リターン

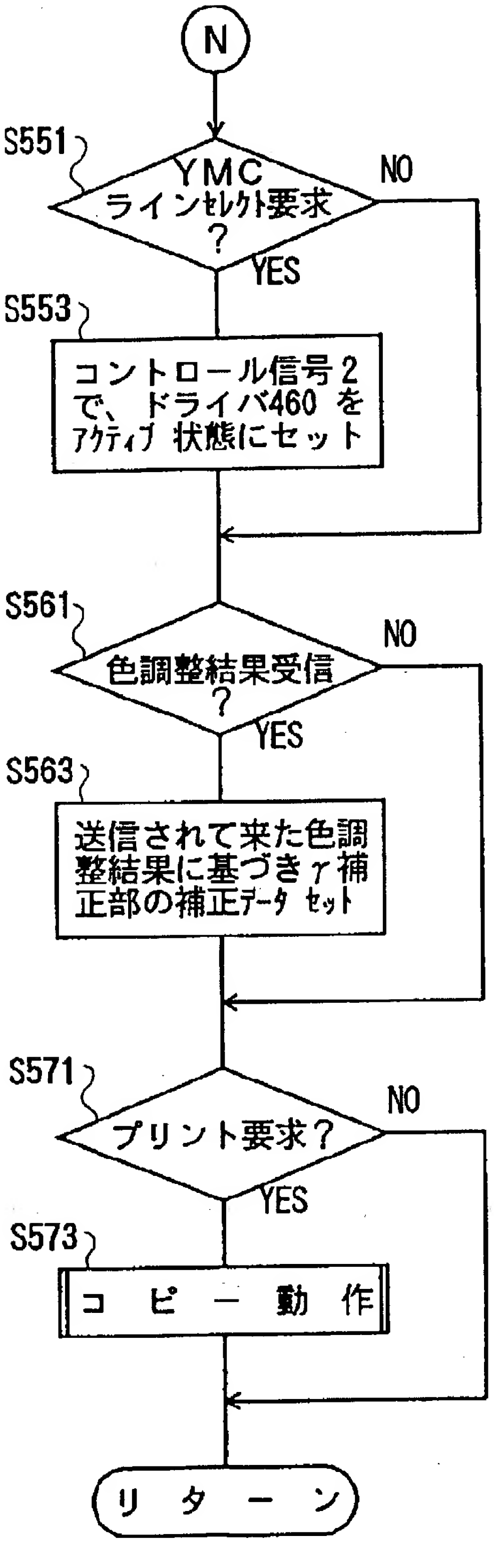
[Drawing 15]


S51
画像調整処理
S201
画像調整メニュー　表示
S203
選択？
=終了
S211
色調整処理
S221
画像調整メニュー非表示
S223
複写機側へスキャン要求
S225
色調整結果を
複写機側へ送信
S227
ＹＭＣラインをｾﾚｸﾄ要求
S231
データ取込完了？
NO
YES
S233
表示用変換係数
（ＹＭＣﾃﾞｰﾀ 用）セット
S235
ＣＲＴへ表示
リターン

[Drawing 17]


コマンド受信
S501
コマンド受信有?
NO
YES
S521
複写機側データ セレクト要求?
NO
YES
S523
コントロール信号1でセレクタ部415 を複写機側データ に セット
S531
RGB ラインセレクト要求?
NO
YES
S533
コントロール信号3で、ドライバ450 をアクティブ 状態にセット
S541
スキャン要求?
NO
YES
S543
スキャン処理
N
リターン

[Drawing 18]


N
S551
YMC
ラインセレクト要求
？
NO
YES
S553
コントロール信号２
で、ドライバ460 を
アクティブ 状態にセット
S561
色調整結果受信
？
NO
YES
S563
送信されて来た色調
整結果に基づきγ補
正部の補正データ セット
S571
プリント要求？
NO
YES
S573
コピー動作
リターン

[Translation done.]

List of U.S. Patents resulting from PLUS search on 5/20/2003:

4568978
5235410
6304671
5668596
5412577
5689425
4346402
5202935
5589954
5712930
5754710
4800591
5008739
5313310
5774578
5841897
6160725
4276615
4473849
4983973
5196924
5268687
5315321
5329385
5764216
5844689
5910796
6108098
6215468
6215468
4390778
4424589
4427887
4612573
4633301
4803556
4846689
4862255
4928102
4941039
4954824
4999668
5282144
5323241
5367338

5394195
5499361
5557640
5600159
5615279).pn.

(5640235
5663998
5715378
5726540
5734799
5764387
5764795
5764796
5809894
5818521
5883539
6002497
6057946
6094502
6097837
6118549
6125199
6233059
6320668
6366062
6377915
6406117
6415065
6432624
6493467
5610732
6069716
4467146
4975862
5315381
5519514
5631749
6219517
6219517
4575222
4591904
5572166
5633953
5847848
5914793
6144503
6215561

6215561
4541070
4841362
4868668
4977448
5194946
5200844
5202756).pn.

(5305119
5329062
5333070
5345265
5381349
5528386
5530656
5581298
5585962
5729636
5798790
5828781
5864370
5930388
5974173
5991056
6091880
6125202
6178007
6222648
6222648
4272778
4272694
4275413
4295061
4296632
4352984
4365871
4385326
4399374
4426625
4430720
4437339
4476540
4492930
4500869
4517526
4547797
4588909

4597005
4620221
4623917
4762108
4794460
4808984
4825297
4841200
4853794
4855816
4868679).pn.

(4869579
4894540
4910587
4949184
4962419
4980779
4999702
5008741
5016111
5189321
5189511
5194945
5196937
5225901
5285122
5289546
5296761
5296923
5299034
5309183
5311297
5311328
5317240
5319466
5321468
5387988
5392139
5396300
5408342
5414460
5422738
5426596
5448380
5456172
5471241
5473373

5485191
5489996
5493700
5497123
5497209
5519515
5528240
5539476
5552785
5568284
5574454
5581675
5596448
5610604).pn.

(5610997
5625358
5638071
5657098
5671023
5677646
5710594
5710871
5751032
5787193
5802214
5809181
5812008
5828330
5850486
5877717
5880738
5923677
5946454
5958079
5960110
5990949
5995165
6018363
6023344
6040202
6046779
6064396
6067088
6075573
6075886
6100938
6137542

6148158
6147560
6154121
6154288
6157245
6166781
6169219
6181203
6184739
6198552
6225931
6225934
6225974
6225931
6225934
6225974
6239655).pn.

(6388799
3629490
3624638
3590142
3832054
3809875
4245238
4246778
4257270
4262531
4264210
4270861
4277795
4286223
4290111
4295160
4305418
RE30960
4309604
4314184
4315277
4318040
4319834
4334432
4335399
4336494
4345241
4346962
4348898
4370593

4371265
4376292
4376273
4381365
4386434
4389708
4395712
4396907
4396862
4398209
4399375
4400691
4402015
4418358
4436812
4450482
4451855
4466102
4479392
4486794).pn.